NATIONAL MATERIALS AND MINERALS POLICY, RESEARCH AND DEVELOPMENT ACT OF 1980

HEARING

BEFORE THE

COMMITTEE ON SCIENCE AND TECHNOLOGY U.S. HOUSE OF REPRESENTATIVES

NINETY-SEVENTH CONGRESS

FIRST SESSION

JULY 28, 1981

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NATIONAL MATERIALS AND MINERALS POLICY, RESEARCH AND DEVELOPMENT ACT OF 1980

TUESDAY, JULY 28, 1981

HOUSE OF REPRESENTATIVES,
COMMITTEE ON SCIENCE AND TECHNOLOGY,
Washington, D.C.

The committee met at 10:35 a.m. in room 2318, Rayburn House Office Building, Hon. Don Fuqua (chairman of the committee) presiding.

Present: Representatives Fuqua, Winn, Lundine, Skeen, Dunn, Lowery, Glickman, McGrath, Carney, and Walgren.

[The opening prepared statement of Mr. Fuqua follows:]

OPENING STATEMENT
HONORABLE DON FUQUA
MATERIALS HEARING
TUESDAY, JULY 28, 1981

THE PURPOSE OF THIS HEARING THIS MORNING IS TO REVIEW THE IMPLEMENTATION OF P. L. 96-479, THE "NATIONAL MATERIALS AND MINERALS POLICY, RESEARCH AND DEVELOPMENT ACT OF 1980", AS WELL AS TO CONSIDER OTHER LEGISLATIVE ALTERNATIVES. ONE SUCH ALTERNATIVE IS THE "CRITICAL MATERIALS ACT OF 1981" WHICH I INTRODUCED YESTERDAY, ALONG WITH 21 CO-SPONSORS.

THE MATERIALS ACT OF 1980 CALLED FOR A NUMBER OF RESPONSES FROM THE EXECUTIVE BRANCH TO BE PREPARED AND THEN SUBMITTED TO CONGRESS BY OCTOBER 21, OF THIS YEAR. I WILL NOT GO INTO ANY ELABORATE DETAIL WITH RESPECT TO THOSE RESPONSES. I EXPECT THE TESTIMONY TODAY WILL MORE THAN ADEQUATELY EXPLAIN SOME OF THOSE DETAILS. RATHER, I WOULD LIKE TO MAKE THE FOLLOWING BRIEF BUT IMPORTANT POINTS:

- IT WAS NOT THE INTENT OF THE ORIGINAL MATERIALS ACT TO SOLICIT YET ONE MORE MONUMENTAL "STUDY". RATHER, WE WERE AND ARE LOOKING FOR A <u>POSITIVE</u> PROGRAM OF EXECUTIVE ACTION TO DEAL WITH THE MULTITUDE OF MATERIALS PROBLEMS AND ISSUES ALREADY IDENTIFIED.

- It seems to us that the greatest problem of the past has been in identifying WHO has the overall responsibility in coordinating and formulating our national materials programs in a comprehensive way. The purpose of my new bill on materials is to rectify that problem.

- Materials problems are not simple problems of minerals import dependency and, hence cannot be easily solved by opening up our public land areas to domestic mining production. In fact it is not clear that we have any large resources of critical minerals economically recoverable in the U.S.

- Our major materials concerns are on the user side of the process. That is as consumers, either industrial or as individuals. The Department of Defense does not need simply a mineral or raw material in hand. It requires a finished product with a given set of properties. Thus we must be concerned with substitution, conservation and processing, as well as supply.

- FINALLY, AS NOTED IN OUR HEARINGS OVER THE PAST SEVERAL YEARS, MATERIALS, THAT IS NEW MATERIALS, OFFER US OPPORTUNITIES AND CAPABILITIES YET UNKNOWN. THESE ARE OPPORTUNITIES IN COMMUNICATION, SPACE, ENERGY, TRANSPORTATION AND MEDICINE, AS WELL AS DEFENSE. THUS A STRONG, COMPREHENSIVE PROGRAM IN MATERIALS R&D IS ESSENTIAL TO ANY NATIONAL MATERIALS POLICY.

IT IS THIS COMMITTEE'S INTENT TO FOLLOW CLOSELY THE CONTINUING IMPLEMENTATION OF P.L. 96-479 NOT JUST THROUGH OCTOBER OF 1981 BUT INTO THE FORESEEABLE FUTURE. THE PROBLEMS ARE NOT SHORT LIVED AND THE SOLUTIONS WE SEEK MUST BE LONG LASTING AND FAR SIGHTED.

I AM LOOKING FORWARD TO HEARING OUR WITNESSES THIS MORNING AND TO CONTINUED INTERACTIONS ON THIS IMPORTANT ISSUE.

The CHAIRMAN. The committee will be in order.

The purpose of the hearing this morning is to review the implementation of Public Law 96-479, the National Materials and Minerals Policy Research and Development Act of 1980, as well as to consider other legislative alternatives. One such alternative is the Critical Materials Act of 1981, which I introduced yesterday along with 21 cosponsors.

The Materials Act of 1980 called for a number of responses from the executive branch to be prepared and submitted to Congress by October 21 of this year. I will not go into any elaborate detail with respect to those responses. I expect the testimony today will more than adequately explain some of those details.

Rather I would like to make the following brief but important points.

It was not the intent of the original Materials Act to solicit yet one more monumental study. Rather we were looking for a positive program of Executive action to deal with the multitude of materials problems and issues already identified. It seems that the greatest problem of the past has been in identifying who has the overall responsibility in coordinating and formulating our national materials program in a comprehensive way.

The purpose of the new bill on materials is to rectify that problem. Materials problems are not simply problems of minerals import dependence, and hence cannot be easily solved by opening up our public land areas to domestic mining production. In fact, it

is not clear that we have any large resources of critical materials, economically recoverable, in the United States.

The major materials concerns are on the user side of the process. That is as consumers, either industrial or as individuals. The Department of Defense does not need simply a mineral or raw material in hand; it requires a finished product with a given set of properties. Thus we must be concerned with substitution, conservation, and processing, as well as supply.

Finally, as noted in our hearings over the past several years, materials—that is new materials offer us opportunities and capabilities yet unknown. There are opportunities in communications, space, energy, transportation, and medicine, as well as defense. Thus a strong comprehensive program in materials R. & D. is essential to any national materials policy.

It is this committee's intent to follow closely the continuing implementation of Public Law 96-479, not just through October of 1981, but into the foreseeable future. The problems are not short lived, and the solutions we seek must be long lasting and farsighted.

I am looking forward to hearing our witnesses this morning and to continued interaction on this important issue. I realize the hearing, because of the Democratic Caucus and some other activities going on, had been notified that it may be delayed. Since we did have out-of-town witnesses, we felt we should go ahead and proceed with the hearing. Some of the witnesses have been notifed that the hearing might be late, so they are acting accordingly.

It is my understanding that Dr. William O. Baker is present, and, Dr. Baker, we would be happy to hear from you at this time. Dr. Baker is former chairman of the board (retired) of Bell Laboratories, Inc. I understand you are also a former science adviser to President Kennedy.

STATEMENT OF DR. WILLIAM O. BAKER, CHAIRMAN OF THE BOARD (RETIRED), BELL LABORATORIES

Dr. BAKER. Your admirable opening statement, Mr. Chairman, does concentrate attention on the issues that we might submit for your consideration. The initiatives of this eminent committee over the past decade in seeking an appropriate national materials policy have been paced, as you have implied, by the speed of scientific research and development in the solid state and materials sciences, and in engineering.

We have sought to track the implications for materials policy in just the way that you have described so precisely. R. & D. does have a profound impact.

Research regarding Materials and Man's Needs—Report of National Academy of Sciences—relates to our current national situation. These estimates and related work that is ongoing now, and is represented by a number of the members of the materials constituency that are present in this hearing, reflect the coherence of effort in that constituency. Those estimates of our situation and what ought to be done in the times ahead are specific examples of the importance of this committee and the work of its staff in showing where we stand in materials science and engineering.

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The work of the late Franklin Huddle, in pulling together for this group and the Congressional Reference Service such information, is outstanding. The dominant technological aspect of this materials matter has been, and is likely to be for the times ahead, the issue of using knowledge which has been conventionally compartmented and therefore not brought together.

So, Mr. Chairman, the issue of legislative and administrative action here is to assure, through the Federal establishment and, of course, fundamentally through the national community, ways of interacting among groups of experts. These ways of interacting will permit maximum flexibility in the use of critical materials and the prevention of world restraints on access. Yet we still find educational and professional development of materials science and engineering, to represent age-old conventions of separate fields—the fields of metallurgy and ceramics and wood and the like.

So we must respond to the National Materials and Minerals Policy Research and Development Act of 1980 by enhancing the human resources. We believe this is the way to meet the needs, rather than believing that we can assure materials sufficiency by either simple stockpiling or particular trade arrangements or any other single operational device.

We submit that those devices, as important as they are, must be supplemented by better scientific and technical resources, all the way from the design of machines and vehicles, to brooms and batteries, and all other products. We must recognize the range of options that modern solid-state knowledge offers.

We believe that the Federal Government, through its various agencies such as the National Science Foundation, Department of Defense, Department of Commerce, Interior, and others must enhance the interdisciplinary university laboratories, in their work in preparing people for careers in materials science and engineering.

It is estimated that the total national spending for research and development of all kinds in the coming year will be about $79 billion. A little more than one-thousandth of that amount is being put into the interdisciplinary programs for materials science and engineering in the universities and colleges, as represented primarily by the National Science Foundation.

Now, of course, other agencies are supporting some additional materials science and engineering research and education, but this figure of one-thousandth of our total national effort in basic science in the materials fields is too low, we believe. And it has been thus characterized in our earlier National Academy of Sciences studies.

Approximately 70 percent of that total of $79 billion investment is in activities performed by industry, which amounts to about $57 billion in this coming year. These programs, we can report to you from detailed study of the professional societies and enterprises that are involved, such as the Federation of Materials Societies which are represented here by the head, Dr. Marglin—these activities contain grossly inadequate contents of materials science and engineering.

There is a need to combine separated disciplines and to provide the skilled personnel which will permit that. And the industrial activities are deficient very considerably because of the lack of that

skilled personnel in the physical sciences and the engineering sciences and professions.

Specifically, we find in new engineering doctorates that our university output has declined from a national maximum in 1971 of about 3,500 to a figure of less than 2,500 in the latest year of full information, which is 1979. This is in the face of enormous growth, perhaps doubling—which has gone on under the general cognizance of this committee, by the way—in our total technological activity and demand. That is in engineering and engineering science. In physics, the numbers drop from about 1,600 to 1,000 in the same span of time, less than a decade. In chemistry, the annual total has gone from 2,100 to 1,500, and in the mathematical sciences from about 1,200 to 700.

This is a formula for sure disaster in many aspects of our national economy. But nowhere will this decline in academic research and graduate study be more damaging than in the generation of new talent for materials science and engineering. And on this talent and on the capabilities that come from it, we believe, depends much of our effective industrial work as well as our broad materials policy.

We would urge and submit, Mr. Chairman, concerning pending recommendations of the National Academy report, of some other ongoing task force reports, and of such independent enterprises as the CHEMRAWN Conference on Organic Raw Materials, that those recommendations be implemented. They have not been. We have nearly a decade of this "pending" quality, and we hope that we can expect strong Federal attention to the diversity of recommendations which I will not take time to repeat here. These do involve primarily assurance of additional human resources for the advance of materials science and engineering.

We would conclude by emphasizing the combinations of new knowledge that we are attributing as necessary to the progress of materials science and engineering. Therefore these are essential to the progress of the Policy Act that you are pursuing. Also these combinations of new knowledge are ones underlying the most vigorous phases of our national enterprise—of our national enterprise in security and public affairs, as well as in industry.

The technology applications of materials science and engineering are pervasive, and they require such combinations of new knowledge. We should be mindful that they pervade every element of our industrial capabilities. And we conclude by representing the diversity of fields by realizing the role of such combined knowledge in new work on solid electrolytes such as the lithium intercalation compounds, which offer a vital improvement in the storage of electricity. In the memory sections of our computers and communications automata, using the magnetic bubble domain; in semiconducter junction devices; in catalyst and catalytic supports for the proper isomerization in the utilization of petroleum and the provision of virtually all liquid fuels—are all exercises in solid-state science and engineering. So are cement matrix composites, on which much modern construction depends.

Nuclear waste management depends on the material properties of containers and of earth cavities and other behaviors of radioactive aggregates.

The quenching or rapid solidification of matter offers new opportunities for novel alloy and glass formation through control of solid-state phases. I would point out that the strongest materials so far produced in fiber form of pure silica is a result of special glass treatment for work in communications and computers, but it has offered also a resource in this type of materials.

And finally, ion implantation provides the semiconductor industry with devices but also offers vast possibilities in corrosion resistance and mechanical improvement of metal surfaces.

We would emphasize, gentlemen, that the opportunities for the research and development implementation of this act demand levels of educational output of university activities, and enhancement of our graduate students that we are not having. We hope very much that a total Federal emphasis can be put in that direction.

Thank you.

[The prepared statement of Dr. Baker follows:]

Mr. Chairman and Distinguished Members of the Committee on Science and Technology of the U.S. House of Representatives:

The initiatives of this eminent Committee over the past decade, in seeking appropriate national materials policy, have been paced by the speed of scientific research and development in solid state and materials science and engineering. We have sought to track the implications of these factors on materials policy and role in our national security and economy. Examples are through such evaluative studies as the COSMAT report, organized by Professor Morris Cohen of M.I.T. and myself, entitled "Materials and Man's Needs", 1975. Estimates of the impact of new science on materials engineering appear in the ASM lecture in Metallurgical Transactions A, 1205, (1977) and the monograph "Advanced Technology", edited by P. H. Abelson and Mary Dorfman, published by the American Association for the Advancement of Science in 1980.

These estimates are but specific examples of admirable records of materials issues compiled by the Legislative Preference Service, especially under the enthusiastic leadership of the late Dr. Franklin Huddle. Indeed the Congressional interest in this field has been already of major value in identifying and interrelating our materials resources and needs.

The dominant technological and industrial aspect of this matter has been (and is likely to be for years to come) the issue of using knowledge which has been conventionally compartmented. That is, modern

materials science and engineering, which permit us to exert maximum flexibility in use of critical materials and prevention of world restraints on access, depends on interdisciplinary knowledge. Yet in the educational and professional development of this knowledge, age-old conventions of separating metallurgy, ceramics, fibers, cellulose, wood, plastics and other divisions of solid state, appear. The impact of this established and even understandable compartmentation goes far beyond the obvious matter of product planning, or government or industry specifications, tied to a particular material. Rather, it influences the customs of design and the notions of the design engineer, from whom comes so large a fraction of formations of matter vital to our national product.

So overall we must respond to the National Materials and Mineral Policy Research and Development Act of 1980 by enhancing our expertises, our skilled human resources. Accordingly, all the way from design of machines and vehicles to brooms and batteries, we must recognize the range of options that modern solid state knowledge offers. As we've reported in detail to this Committee earlier, (1978 and 1979) actions should be taken by the Federal Government, especially through the National Science Foundation, but also in coordination with the Department of Defense and the Department of Commerce, to enhance the interdisciplinary university laboratories and to extend the study of material, science and engineering widely through the colleges and universities of our nation.

It is believed that the total national spending for research and development in 1982 will be about $79 billion in present dollars. Yet little more than one-thousandth of this amount is being put into the interdisciplinary programs for materials science and engineering carried forward in universities and colleges by the National Science Foundation. And approximately 70 percent of the R&D total are the activities performed by U.S. industry, about $57 billion in the next year. These programs contain grossly inadequate contents of materials science and engineering. Suitably trained and skilled staff are one deficiency. Further, however, there is concern about the principle mentioned at the beginning. In this, appropriate materials science and engineering are said to come from combinations of many often separated disciplines. Now the most significant of these, or at least the most directly pertinent, are the physical sciences and engineering sciences and professions. Here, we find in new engineering doctorates a decline from a national maximum in 1972 of about 3500 produced from the universities that year to a figure of less than 2500 in 1979, - in the face of notable growth in total technological activity and demand! Likewise, in the field of physics, the numbers dropped from about 1600 to 1000 in the same span, roughly a period of a decade. In chemistry, the output has gone from 2100 to 1500 and in the mathematical sciences from about 1200 to 700. This is a formula for sure disaster in many aspects of our national economy, security, and social well being. But nowhere will this decline in academic research (for that is where graduate study flourishes) and in the generation of new talent be more strongly felt than in the materials science and engineering on which we believe so much of our effective materials policy must increasingly depend.

Accordingly, we believe that compelling recommendations for action in education and Federally supported research in engineering and materials are outlined in the National Academy of Science's Report "Materials and Man's Needs" and in subsequent special recommendations of the Chemrawn I Conference on Organic Raw Materials, and in the various derivative studies of the Materials Research Society, of the American Chemical Society, the American Physical Society, the National Academy of Sciences and various related groups. These should herewith be implemented, as basic elements of national materials policy.

We do believe this is the most urgent issue in the aspects of the National Materials and Minerals Policy Research and Development Act on which we are qualified to speak.

We conclude by illustrating here (graphs of spinodal alloys and silica lightguide fibers) two examples of how new combinations of knowledge are allowing materials usage and conservation to be dramatically improved. This is especially evident in high technology applications. But we should be mindful that materials science and engineering pervade every element of our industrial capabilities. Thus, the diversity of fields is represented by realizing that new work on solid electrolytes such as lithium intercalation compounds offers vital improvement in electric-storage batteries; principal memory sections of our computers and automata come from magnetic bubble domains, ferrite core, and semiconductor junction devices - all of these derive from special materials

discoveries; the catalyst and catalytic supports for proper isomerization and best utilization of petroleum and the provision of virtually all liquid fuels are exercises in solid state science and engineering; cement matrix composites on which much modern construction depends are subjects of recent materials technology advance; nuclear waste management depends on the material properties of containers and of earth cavities and on other behavior of the radioactive aggregages; quenching, or rapid solidification, offers new opportunities for novel alloy and glass formation through control of solid state phases; ion implantation provides present semiconductor industry devices but offers also vast possibilities in corrosion resistance and mechanical improvement of metal surfaces; films and interfaces dominate not only moving machinery through lubrication and frictional constants but the basis also for modern integrated electronics circuitry.

W. O. BAKER
BELL LABORATORIES
(RETIRED)
JULY 18, 1981

The CHAIRMAN. Thank you, Dr. Baker. And now we will hear from Mr. Simon D. Strauss, chairman of the Minerals Availability Committee of the American Mining Congress.

And then we will have some questions for both of you. Mr. Strauss, we are happy to have you here.

STATEMENTS OF DR. SIMON D. STRAUSS, CONSULTANT TO ASARCO, INC. AND CHAIRMAN OF THE MINERALS AVAILABILITY COMMISSION, AMERICAN MINING CONGRESS

Dr. STRAUSS. I appear to discuss Public Law 96-479, the National Materials and Mineral Policy Research and Development Act of 1980. This act represented a reaffirmation of congressional intent expressed in 1970 when Congress first enacted a Mining and Minerals Policy Act.

In both of these legislative actions, the Congress expressed its desire to strengthen the country's access to critical and strategic materials essential both to the national defense and to its economic well-being. To date, however, these remain largely statements of intent.

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Positive coordinated action by Government agencies to encounter greater output from domestic mines and processing plants has been lacking, at least until recently, although the Interior Department, under the leadership of its new Secretary, is beginning to take steps to encourage exploration for and leasing of mineral deposits on public lands.

From the viewpoint of the mineral industry, Government agencies until quite recently have been looking at individual trees and not at the woods when considering the mining industry. Each department considers that aspect of the mining industry which falls within its own field of responsibility—health, the environment, foreign relations, trade, taxes, the stockpile, and other special Government concerns.

The result is, to change metaphors, that mineral policy is like the ancient definition of the camel—as a horse designed by a committee.

The result has been that there is not truly a consistent minerals policy in this Nation. The American mining industry is in a quite different position from mining industries in other countries, which have well-coordinated programs to promote an assured supply of essential minerals and other materials.

As an example, one can cite the melancholy record of minerals processing in the United States, Over the last decade the industries concerned with smelting zinc and with processing of ferroalloys have recorded shocking declines in volume. Within the last year there have been signs of the beginning of a comparable deterioration in the domestic processing of copper. Let me cite a few figures:

In 1970 U.S. smelters produced 961,163 tons of zinc. In 1980 they produced 395,300 tons. U.S. production of ferro-manganese in 1970 was 1,052,000 tons; in 1980, it was 406,000 tons. U.S. production of ferro-chrome was 406,000 tons in 1970; in 1980 it was 290,000 tons. In each case, you see a decline of about half during the period when the mines and minerals policy of the country was in effect and supposedly supporting the industry.

The 1970 production of zinc included the processing of a large tonnage of imported feed but more than half the ore processed came from domestic mines, which that year produced 534,100 tons of recoverable zinc. As the number of domestic zinc smelters shrank from 14 to 6, domestic miners faced higher transportation costs to ship their product to processing plants. Domestic mine production of zinc in 1980 was only 379,000 tons.

The average price of zinc in 1970 was about 15 cents a pound; in 1980 it was over 37 cents a pound. This did not quite keep pace with inflation, but since zinc is a worldwide industry, it is notable that world statistics do not show comparable declines elsewhere. In 1970 free world mine production was 4,515,000 tons. In 1980 free world produced 4,976,000 tons. In the same way, refined production of zinc on a free world basis rose from 4,139,000 tons in 1970 to 4,896,000 tons in 1980. While the United States was shrinking, the rest of the world was rising.

I will not provide similar statistical detailed information with respect to manganese and chrome. There is no domestic mine production of these two ores. The processing plants here depend on imported raw materials. The reduction in their production has

been offset by a corresponding increase in the imports of foreign ferro-manganese and ferro-chrome.

This trend means that we are limited to a smaller number of sources for imports and consequently more subject to difficulties in the event of embargoes, military action, or other international upsets.

Ever since 1946, national policy has been to reduce dependence on imported materials in times of emergency through the strategic stockpiles. The stockpile of manganese consists largely of stockpiled ores. A substantial portion of the chrome stockpile also consists of ores. These stockpiles will prove of little value if domestic processing capacity is not available to convert the ores into the products needed by the steel industry.

The causes for the dramatic reduction in processing capacity here are many. If the committee desires, I will be glad to elaborate. What needs to be stressed now is the simple fact that despite the erosion of these industries, no Government action has been taken to counteract that trend—with a single exception of temporary tariff protection for the ferro-chrome industry.

Domestic zinc smelters held a meeting with Government officials in 1973 regarding the wave of plant shutdowns. The industry was accorded a courteous hearing, but nothing happened because no Government agency felt any responsibility to take any action.

Possibly after considering all the facts, a determination might be made that the national interest is not adversely affected by this loss of processing capacity. However, there has been no such inquiry or determination. The reduction occurred, and industry does not know whether now the Government feels it is good or bad.

By contrast, in countries such as Germany and Japan, the evaluation of their basic raw material processing capacity is a matter of continuing attention and concern of their governments. Here again, I will not go into detail but will be glad to cite specific actions taken by those governments to insure that they have adequate processing capacity.

Now as indicated in an earlier remark, there are signs that a similar trend may be facing the copper processing industry. Major smelting and refining facilities in Montana were closed last fall because the operator was reluctant to invest the huge sum required to modernize the plants and bring them into compliance with environmental regulations. The domestic mine production previously treated in those plants is now being shipped to Japan for processing. To the extent that the copper is not processed in this country or at least on this continent, it may be unavailable to us in times of national emergency.

These facts are cited to reinforce the earlier statement that the mining industry feels Government agencies have been looking at trees and not at the woods. A proposed Critical Materials Act of 1981, which I understood from your earlier statement, Mr. Chairman, was in fact introduced yesterday, has been drafted which would establish a council and office on critical materials in the Executive Office of the President. Presumably if such an office had been in existence during the 10 years between 1970 and 1980, the drastic drop in domestic processing production for zinc and ferroalloys would have received some kind of comprehensive evaluation.

In the report of the Commission on Supplies and Shortages published in 1976, one of the recommendations dealt with this problem of coordinating the total picture on critical materials. Unfortunately, like so many voluminous Government studies, there was no followup on the Commission's recommendations.

If the 1980 act which your committee is considering today is to have any substantial impact, somehow, somewhere, a comprehensive monitoring activity must be established within the administration. Such an activity will review all of the factors—which admittedly are complex and numerous—that impact on production and supply of critical materials.

Your chairman has requested a relatively brief statement. I am prepared to provide greater detail if you so wish.

In February of this year I appeared before the Subcommittee on International Economic Policy of the Senate Foreign Relations Committee to discuss import dependence for criticl materials. If you deem it appropriate, I would like to file with the committee a copy of that statement which provides additional details regarding import dependence, the strategic stockpile program, the relative position of the allied industrialized nations of Western Europe and Japan, the heavy dependence for imports of certain materials from Southern Africa and the Soviet Union, the possibilities of cartels, and the question of access for exploration on public lands.

Thank you for giving me this opportunity to appear. I will be glad to respond to questions.

[The prepared statement of Dr. Strauss follows:]

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Statement by

SIMON D. STRAUSS

CHAIRMAN
MINERALS AVAILABILITY COMMITTEE
AMERICAN MINING CONGRESS

Before the

COMMITTEE ON SCIENCE AND TECHNOLOGY
U.S. HOUSE OF REPRESENTATIVES
WASHINGTON, D.C.

Tuesday, July 28, 1981
Room 2138, Rayburn House Office Building

Mr. Chairman and Members of the Committee:

My name is Simon D. Strauss. I appear in response to your request to discuss P. L. 96-479, the National Materials and Minerals Policy, Research and Development Act of 1980. I represent the American Mining Congress, a trade association, for which I serve as Chairman of the Minerals Availability Committee. I am the retired Vice Chairman of ASARCO Incorporated, a company engaged in the mining and processing of minerals. Currently I continue as a consultant for that company.

The 1980 Act represented a reaffirmation of Congressional intent expressed in 1970 when Congress enacted a Mining and Minerals Policy Act. In both these legislative actions, the Congress expressed its desire to strengthen the country's access to critical and strategic materials essential both to the national defense and to its economic well-being. To date, however, these remain largely statements of intent. Positive coordinated action by government agencies to encourage greater output from domestic mines and processing plants has been lacking until recently--although the Interior Department, under the leadership of its new Secretary, is beginning to take steps to encourage exploration for and leasing of mineral deposits on public lands.

From the viewpoint of the mineral industry, government agencies until quite recently have been looking at individual trees and not at the woods when considering the mining industry. Each department considers that aspect of the mining industry which falls within its own field of responsibility--health, the environment, foreign relations, trade, taxes, the stockpile, and other special government concerns.

The result is, to change metaphors, that mineral policy is like the ancient definition of the camel--as a horse designed by a committee.

The result has been that there is not truly a consistent minerals policy in this nation. The American mining industry is in a quite different position from mining industry in other countries, which have well-coordinated programs to promote an assured supply of essential minerals and other materials.

As an example, one can cite the melancholy record of minerals processing in the United States. Over the last decade the industries concerned with smelting zinc and with processing of ferro-alloys have recorded shocking declines in volume. Within the last year there have been signs of the beginning of a comparable deterioration in the domestic processing of copper. Let me cite a few figures:

In 1970 U. S. smelters produced 961,163 tons of zinc. In 1980 they produced 395,300 tons. U. S. production of ferro-manganese in 1970 was 1,052,000 tons; in 1980 it was 406,000 tons. U. S. production of ferro-chrome was 406,000 tons in 1970; in 1980 it was 290,000 tons.

The 1970 production of zinc included the processing of a large tonnage of imported feed but more than half the ore processed came from domestic mines, which that year produced 534,100 tons of recoverable zinc. As the number of domestic smelters shrank from fourteen to six, domestic miners faced higher transportation costs to ship their product to processing plants. Domestic mine production of zinc in 1980 was only 379,000 tons.

The average price of zinc in 1970 was about 15¢ a pound; in 1980 it was over 37¢ a pound. This did not quite keep pace with inflation but since zinc is a worldwide industry it is notable that world statistics do not show comparable declines. In 1970 Free World mine production was 4,515,000 tons. In 1980 Free World mine production was 4,976,000 tons. In the same way refined production of zinc on a Free World basis rose from 4,139,000 tons in 1970 to 4,896,000 tons in 1980

I will not provide similar statistical detailed information with respect to manganese and chrome. There is no domestic mine production of these two ores. The processing plants here depend on imported raw materials. The

reduction in their production has been offset by a corresponding increase in the importation of foreign ferro-manganese and ferro-chrome.

This trend means that we are limited to a smaller number of sources for imports and consequently more subject to difficulties in the event of embargoes, military action or other international upsets.

Ever since 1946 national policy has been to reduce dependence on imported materials in times of emergency through the strategic stockpiles. The stockpile of manganese consists largely of stockpiled ores. A substantial portion of the chrome stockpile also consists of ores. These stockpiles will prove of little value if domestic processing capacity is not available to convert the ores into the products needed by the steel industry.

The causes for the dramatic reduction in processing capacity here are many. If the Committee desires I will be glad to elaborate. What needs to be stressed now is the simple fact that despite the erosion of these industries no government action has been taken--with a single exception of temporary tariff protection for the ferro-chrome industry.

Domestic zinc smelters held a meeting with government officials in 1973 regarding the wave of plant shutdowns. The industry was accorded a courteous hearing but nothing

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happened because no government agency felt any responsibility.

Possibly after considering all the facts a determination might be made that the national interest is not adversely affected by this loss of processing capacity. However, there has been no such inquiry or determination.

By contrast in countries such as Germany and Japan the evaluation of their basic raw material processing capacity is a matter of continuing attention and concern of their governments. Here again I will not go into detail but will be glad to cite specific actions taken.

Now, as indicated in an earlier remark, there are signs that a similar trend may be facing the copper processing industry. Major smelting and refining facilities in Montana were closed last fall because the operator was reluctant to invest the huge sum required to modernize the plants and bring them into compliance with environmental regulations. The domestic mine production previously treated in those plants is now being shipped to Japan for processing. To the extent that the copper is not processed in this country or at least on this continent, it may be unavailable in times of national emergency.

These facts are cited to reinforce the earlier statement that the mining industry feels government agencies have been looking at trees and not at the woods. A proposed

Critical Materials Act of 1981 has been drafted which would establish a council and office on critical materials in the Executive Office of the President. Presumably if such an office had been in existence during the ten years between 1970 and 1980 the drastic drop in domestic processing production for zinc and ferro-alloys would have received some kind of comprehensive evaluation.

In the report of the Commission on Supplies and Shortages published in 1976 one of the recommendations dealt with this problem of coordinating the total picture on critical materials. Unfortunately, like so many voluminous government studies, there was no follow-up on the Commission's recommendations.

If the 1980 Act which your Committee is considering is to have any substantial impact, somehow, somewhere a comprehensive monitoring activity must be established within the Administration. Such an activity will review all of the factors--which admittedly are complex and numerous--that impact on production and supply of critical materials.

Your Chairman has requested a relatively brief statement. I am prepared to provide greater detail if you so wish.

In February of this year I appeared before the Subcommittee on International Economic Policy of the Senate Foreign Relations Committee to discuss import dependence for

critical materials. If you deem it appropriate, I would like to file with the Committee a copy of that statement which provides additional details regarding import dependence, the strategic stockpile program, the relative position of the allied industrialized nations of Western Europe and Japan, the heavy dependence for imports of certain materials from Southern Africa and the Soviet Union, the possibilities of cartels, and the question of access for exploration on public lands.

Thank you for giving me this opportunity to appear. I will be glad to respond to questions.

The CHAIRMAN. Thank you, Dr. Strauss.

You mentioned on page 6 of your testimony the bill that I dropped in yesterday, the part about establishing a council.

Dr. STRAUSS. Yes, sir.

The CHAIRMAN. Would you elaborate on that?

It is the intent of the bill that a lot of departments get involved in and somebody at the top has to try to coordinate this policy. Maybe you could elaborate.

Dr. STRAUSS. Yes, I would like to elaborate on that, Mr. Chairman. I believe that our industry is strongly in support of that concept. I am not too familiar with the precise details of the proposal, but the need for such a comprehensive evaluation of minerals policy is obviously great. Let me revert to the facts I cited with respect to the zinc industry.

As I told you, we suffered this dramatic shrinkage in the size of the industry, from 14 plants operating in 1969 to only six operating today. Actually, by 1973, when we appealed to the Department of Interior for some consideration of this matter, by then six plants had shut down. There were only eight plants operating. We went to the Department of the Interior, and we said that we knew there were many reasons for this trend. It would have been easy for the industry to have ascribed the shutdown of plants solely to the complex and numerous Government regulations being issued in the health and environmental fields. They were a contributing cause, but they were surely not the only cause. Some of the plants were obsolete, other plants were geographical poorly located. The point was that we spread all of these facts on the table before the Interior Department, and they had representatives of some other departments there. They said they would study the problem.

We never had any kind of response. In Western Europe and in Japan during that period, new modern plants were being built. They, too, had obsolete plants. They, too, had complex Government

regulations. But those countries recognized the importance of having domestic processing facilities. They are just as import-dependent as we are with respect to zinc—in fact, more so. They provided energy sources, they provided low-cost loans. They encouraged the shutdown of small inefficient plants. They made possible the combination of companies in joint ventures which, under our antitrust problems, would have been difficult, perhaps impossible. As a result, they have modern efficient zinc smelting facilities today.

It is notable, as an example, that both the United States and Japan have a domestic capacity to mine zinc, equivalent to about one-third of their needs. Both countries need to import two-thirds of their requirements. At present, of the imports into the United States, more than three-quarters are in the form of finished metal. That imposes a heavy drain on the position of the dollar, because it costs more to import metal than to import an equivalent amount of raw material to be processed here at home.

What is the Japanese record? The Japanese import more than 95 percent of their zinc requirements in the form of ore, which they convert at home. This is a deliberate policy. It has assisted them enormously in respect of maintaining the value of the yen during recent years, maintaining employment, and creating a home capacity to operate.

Now, I must say here that it is quite possible that if you had an office that would look at this picture, all aspects of it, the decision might well be that the country has other things to do that are more important than smelting zinc. We can count on zinc from Canada. We can count on zinc from Mexico. So, all right, we are sorry. We have lost some capacity at home. But no such determination has been made. That is the point that bothers me. Nowhere in this Government has somebody asked do we need a zinc smelting industry or don't we need a zinc smelting industry? Instead, an industry has gone down the drain, without a thoughtful evaluation, as far as I can tell, within the Government of whether there should be such an industry or there should not be such an industry.

Since zinc is an important component of our defense posture, the stockpile objective for zinc is 1,400,000 tons and there is less than 500,000 tons on hand. It is obvious that somewhere else in the Government people think zinc is important. But nobody has said a word or lifted a finger in this Government so far as I can tell during this 10 years, despite representations from the industry about reversing this trend.

Some of the individual companies have taken actions to build new plants or have considered building new plants, but we have had no encouragement or assistance of any kind.

Now, I'm not asking on behalf of the industry for subsidies, import restrictions, or anything. That is further down the road.

What I am saying is somebody has got to think about this problem from the national point of view, not from the industry's point of view, and come up with a policy. But there has been no instrumentality to do that as far as I can tell.

Now, if the bill introduced yesterday puts that kind of machinery in focus, I think it will go a long way toward helping us meet our materials problems. We need to really look at them on the whole.

When I say that nobody has looked at the zinc smelting industry as a whole, sure, the EPA is worried about emissions of zinc from the smelters. OSHA is worried about the health of the zinc smelter workers. The Treasury Department has made sure that they collect the taxes they need. The Office of the Special Trade Representative has considered whether or not the duty on zinc in adequate, but nobody has looked at the whole picture.

Mr. DUNN. Point of inquiry, Mr. Chairman.

The CHAIRMAN. Yes.

Mr. DUNN. The witness was asked to comment on the 1980 law, as well as the new one, which he said he was not real familiar with. Since you introduced this, would you take a couple of minutes and explain the differences between the two and, indeed, what the 1981 bill would do, for their edification as well as my own.

The CHAIRMAN. The 1980 bill provided that there be a coordination policy and that we establish a national materials policy.

The bill that I introduced yesterday provides that there be established a coordinating council within the Executive Office of the President. It would be made up of individuals acting to coordinate and to develop more coordinated materials activities. This is simply a further extension of the bill that we passed in the last Congress.

Mr. DUNN. Thank you.

The CHAIRMAN. I have one question of Dr. Baker.

It is rather clear, I think, in Congress—and it has been expressed many times by this committee—that we are becoming more and more dependent in the United States on foreign sources for strategic and critical materials. And the implication of what this dependency for our military security or economic health may have.

Do you think that we are engaged in any type of resource war with other superpowers?

Dr. BAKER. Mr. Chairman, I believe that the message from science and engineering is relatively optimistic, or at least comforting there. However, I think the nature of world competition that Dr. Strauss has summarized so expertly is a kind of battle. It has obviously a struggle for the resources in nature. I think that there are strategic maneuvers which will restrain some of the easy access to materials, but that the response of science and engineering, if done as we are proposing, as this committee has properly seen it, that response will be very effective in preventing us from losing any of the battles effective in assuring a good position in the "resource war." Now, I put quotes around that.

For it is true—despite some of the doubts of the existence of this phenomena, that not many years ago the quartz-producing nations apparently engaged in a little exercise like OPEC on a very small scale, and said, "We will form a combine to restrict the access to quartz." The science and technology of that field, as you know, is very active, because almost all of our modern electronics depend on some elements of quartz crystal circuitry.

Accordingly, the United States was able to increase its synthetic output of quartz from some factories that Western Electric, and other manufacturers maintained. We found the whole external pressures, the foreign efforts at cornering the market, vanished. In many areas that Dr. Strauss has described, that would not be possible because we do not have fully adequate domestic resources.

But I am giving you this detailed answer to say that we believe that science and engineering of materials will be an essential resource in preventing a resource war, in keeping us from having, really, international tensions and hostilities on the basis of materials.

The CHAIRMAN. Dr. Strauss, would you like to comment?

Dr. STRAUSS. Yes, I would.

In most materials the exporting countries are so dependent on the income from the sale of their products and, furthermore, because of the limited financial resources of the Socialist or Communist block, it is quite clear that for most materials the exporters of products like bauxite or tin, in which we are heavily dependent on imports, it is unlikely that we are going to be denied access. There will be efforts such as Dr. Baker has described perhaps to increase the price. There was such an effort in connection with bauxite some years ago. There is an international agreement that is designed to assist the tin producers. These are not likely to create serious problems for us.

I think the likelihood of effective cartels in the nonfuel minerals are fairly limited. The most serious problem confronting us is the fact that due to an accident of geology and geography, for certain materials the major economic resources in the world are concentrated either in the Soviet Union or in southern Africa. And this creates certain hazards from a political point of view in the event of a combination developing between the Soviet Union and leftward leaning governments in southern Africa. The particular products that are involved that have been frequently referred to in the press are manganese, chrome, cobalt, and platinum metals. And you might almost say also perhaps industrial diamonds.

It is a curious fact that one of the most effective cartels is the diamond cartel. Although the Russians are large producers of diamonds and although their ideology is 180 degrees from the ideology of the Republic of South Africa, there appears to be coordinated action in the diamond field between these two countries.

Now, if that were to be extended into such areas as platinum metals, manganese, and chrome, it could impose a heavy economic penalty on us. And in the event of hostilities, if there were a left-dominated regime in charge in South Africa, it is possible we might be denied access. And for that reason—and I believe it is recognized now by the people responsible for the stockpile program—for that reason there is a great deal of stress being played now, particularly with respect to cobalt, platinum, where our holdings are far below the targets, and to a lesser degree manganese and chrome.

The CHAIRMAN. Thank you.

Mr. Winn.

Mr. WINN. Thank you, Mr. Chairman.

Dr. Baker, what do you suggest to increase the numbers of professionally trained people in sciences involving materials? Are there any educational resources in place at the present time for that?

Dr. BAKER. Yes, sir. The Nation has a group of universities that are particularly skilled. There are about 20 of them. They are particularly skilled in the interdisciplinary study of materials.

And what we are concerned about is that the support of graduate students, the fellowship funding, and the necessary research for the professors, the faculties in those institutions, that support is diminishing and is below what is believed to be necessary to keep our supply of graduates even steady, to say nothing of increasing.

Now, you touch on a very interesting and crucial matter of supply and demand. Here we find many capable students are leaving universities at the end of undergraduate study because of the great demand for them in industry and in other fields of materials activity.

They find that the economics of their lives do not favor their efforts to extend their studies or stay in graduate school. And we think this is a very dangerous and unfavorable situation, one which we faced incidentally in the fields of aerospace, missile, and general aerodynamics capabilities in the late 1950's when the Nation had a powerful need for such skills then.

We had then, as a result of the Gilliland study and other efforts from the White House Science Office, the recommendation—which the Congress then responded to, and Mr. Teague was a great strength in that, as well as others—to increase the Federal support of fellowships so that students would find capabilities of continued study to be practical and supportable. The numbers went up. We think that that kind of action is very much needed now.

Mr. WINN. I gather then that most of the support came from the Government. What about the commercial community? Does not the commercial community help with support for educating and training these young people?

Dr. BAKER. Indeed, sir, that is a most pertinent issue, which industry has continuously but slowly been able to respond to. We have now in the American Chemical Society and also, in collaboration with the Directors of Industrial Research some efforts to expand that to the levels that would seem necessary in the materials areas, for instance, but also in the broad fields of modern science and technology.

The situation still appears that industry does not yet find a way to put in the necessary funds. Now, when I say "finding a way," it is apparently not yet evident in our society, in our economic structure, to the manager of an industry how his funding research and teaching of in a university pays back fast enough to justify support at the level we are talking about. And I think it is just a matter of mechanisms. I think eventually this Nation can move further and further toward that direct funding that you are suggesting. We have a certain disparity between the time necessary for study, for research, for faculty development, for university operation, disparity between that time and the kind of return in actual earnings and output that an industrial manager has to pay attention to. It is bridging that kind of economic and cultural gap that we are concerned about.

Mr. WINN. Thank you, Doctor.

Dr. STRAUSS. May I make a comment on that, sir. What Dr. Baker has said I think is very relevant simply by drawing your attention to the way in which another government has coped with this particular problem.

Australia, a country with a very small population, recognized a need for a good deal of research and technical training in order to improve its position as an industrialized nation. Corporations there are granted an additional tax benefit for any expenditures on research and development, including funding of education.

Now, I know how complex the tax picture is today. I am not suggesting further complication at this time by any immediate action. I think a study of the consequences of the Australian program would be worth looking at. I agree with Dr. Baker that one of the serious consequences of the present lack of an adequate number of graduate students is that the universities themselves are finding it harder and harder to have the faculty with which to treat—to educate the students. The universities require these advanced degrees for their staff of instructors, and it is a serious problem.

The present inflation has caused industrial companies to raise the starting salaries for holders of bachelor of science degrees to the point where many of the individuals looking at their own positions feel they are better off taking a job in industry now than spending another 2, 4, or 6 years in pursuit of further study. They cannot see that they are going to get that investment in time and money back through adequate salaries.

Mr. WINN. We have that problem in several fields.

I would like to ask you another question, Dr. Strauss. What work is being done to make some of these materials processing methods environmentally acceptable?

Dr. STRAUSS. That is an ongoing and difficult area. In the case of zinc smelting, which I mentioned first, the environmental constraints have been much less severe than they have been in certain other processing plants, simply because the volume of sulfur contained in the materials going through the smelters is smaller in relation to the volume of metal produced than is the case of either the copper or the lead industries, which have serious problems.

There is a geographical problem which has arisen which I do not know the answer to. One of the reasons for the effectiveness of the Japanese and German industries is that they, too, have very strict environmental controls, but when they recover sulfur from the ores that they process in the form of sulfuric acid, they have a market for that geographically immediately adjacent to their processing plants, which are situated for the most part on tidewater and in large industrial centers.

In our country the metal processing industry typically has been relatively remote from industrial centers, and the acid to be shipped long distances. In the case of the company that I have been associated with, we take an average loss of $25 a ton on every ton of sulfuric acid that we recover, simply because it costs us that much more to ship it than it is worth.

This undermines our competitive position in trying to process raw materials in competition with the overseas people.

Mr. WINN. Then you sort of shoot down the philosophy that it might be more economically feasible to process overseas and then ship it back to our country for processing?

Dr. STRAUSS. That is quite all right, sir, as long as we don't have any threat of any kind of military action. During the Second World

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War, our opponents recognized our vulnerability in the strategic materials field. A large number of the vessels sunk were bringing metals back to our shores. If we have to ship our copper ores from Montana to Japan to be processed and then reimported into the United States, that is two long trips across the Pacific. If our adversary should be the Soviet Union, which has a very large fleet of submarines, we are not going to get much of that copper back.

Mr. WINN. I wasn't talking about the military aspect. I'm just talking about the current trends of closing down domestic processing facilities. There must be some alternative to that.

Dr. STRAUSS. The alternative to that is to build plants here. But the economics are against us for the reasons that I cited, with respect to this component of the sulfuric acid.

Mr. WINN. Thank you, Mr. Chairman.

The CHAIRMAN. Let me point out to the other members, and I apologize. We do have a time problem. We have four more witnesses after this in the next panel, and the House goes into session at 12 and we will be having some votes. So let me ask your cooperation, if I could. It is very interesting and very informative, but we do have, unfortunately, a time problem.

Mr. Skeen?

Mr. SKEEN. Mr. Chairman, put me down as one of your supporters; I will cut it short.

The CHAIRMAN. You are a great gentleman.

Mr. Dunn?

Mr. DUNN. One question, Mr. Chairman, on the bill just introduced to set up the council.

Both of you gentlemen have had experience working with the Government and I would cite some of the players in this new council: the Executive Office of the President, Congress and its committees, the Defense Department, the Commerce Department, the Interior Department, and the environmentalist and corporations. Given all of those players, given the fact that one of the hardest things to do in this city is to give up power, do you seriously believe that any one of those committees, persons, or organizations will be willing to give up some of its power to, as you said "pull together for the national good or see the forest for the trees?" I have some serious reservations. The Department of Energy was supposed to have accomplished the same thing, and sitting here for 6 months, I have yet to have someone from nuclear or coal gasification or OTEC or universities or solar say we would like to give up some of our money for the national good. Do you think it will work, gentlemen?

Dr. STRAUSS. I do not know whether it will work or not. All I can say is that it has not really been tried. Whether it will work or not will depend very much on the individual designated, and particularly his access to the senior people in the administration; and by that I really mean, I suppose, the National Security Council, whoever is in charge of economic matters, and the President. If such a person can have the ear of those top officials, then perhaps it can work. If, instead, it just degenerates into a process of memo writing, then it won't work.

Mr. DUNN. Thank you.

The CHAIRMAN. Thank you, Mr. Dunn.

Mr. Lundine?

Mr. LUNDINE. I have no questions, Mr. Chairman.

The CHAIRMAN. Mr. Glickman?

Mr. GLICKMAN. No questions, Mr. Chairman. I ask unanimous consent to have a statement included.

The CHAIRMAN. Without objection, so ordered.

[The opening statement of Mr. Glickman follows:]

OPENING STATEMENT
HONORABLE DAN GLICKMAN
MATERIALS HEARING
JULY 28, 1981

THANK YOU, MR. CHAIRMAN.

I AM PARTICULARLY PLEASED THAT THESE HEARINGS ARE TAKING PLACE TODAY. AS CHAIRMAN OF THE SUBCOMMITTEE ON TRANSPORTATION, AVIATION, AND MATERIALS, I AM ACUTELY AWARE OF OUR NATIONAL DEPENDENCE ON CERTAIN SCARCE AND INCREASINGLY EXPENSIVE RESOURCES. THE AEROSPACE INDUSTRY IS ESPECIALLY DEPENDENT ON SEVERAL ALLOYING METALS THAT NOW COME FROM A VERY LIMITED NUMBER OF POTENTIALLY UNRELIABLE FOREIGN SOURCES.

FOR THIS REASON, I AND THE OTHER MEMBERS OF MY SUBCOMMITTEE HAVE BEEN ACTIVE IN PROMOTING A STEPPED-UP PROGRAM OF RESEARCH AIMED AT FINDING ALTERNATIVE MATERIALS. SO FAR, WE'VE BEEN FOCUSING PRIMARILY ON NASA. BUT, TO BE TRULY EFFECTIVE, SUCH A PROGRAM MUST RECOGNIZE THAT MATERIALS R&D IS A NATIONAL PROBLEM THAT EFFECTS MANY INDUSTRIES AND MANY AGENCIES. WE CAN NO LONGER AFFORD A PIECEMEAL APPROACH.

THIS FACT WAS RECOGNIZED IN THE NATIONAL MATERIALS AND MINERALS POLICY, RESEARCH AND DEVELOPMENT ACT OF 1980. THE ACT CALLED ON THE PRESIDENT TO SUBMIT A PROGRAM PLAN, BY OCTOBER OF THIS YEAR, TO COORDINATE GOVERNMENT MATERIALS POLICY AND PROGRAMS. IT ALSO DIRECTED SEVERAL FEDERAL DEPARTMENTS TO COMPLETE, BY THE SAME DATE, CERTAIN OTHER TASKS.

SO, I AM GLAD WE ARE HAVING THIS HEARING TODAY. IT WILL GIVE US A CHANCE TO MONITOR THE PROGRESS BEING MADE BY THE ADMINISTRATION IN COMPLYING WITH THE ACT.

I WELCOME ALL OF OUR WITNESSES. AND I LOOK FORWARD TO YOUR TESTIMONY.

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The CHAIRMAN. Mr. Carney?
Mr. CARNEY. No questions.
The CHAIRMAN. Mr. McGrath?
Mr. MCGRATH. No questions.
The CHAIRMAN. Thank you gentlemen very much. We do appreciate it very much.

I want to apologize for keeping the next witnesses waiting. They were originally scheduled to go first. We told them we may be starting later than we actually did. But we are happy to have the Honorable Joseph Wright, Deputy Secretary of the Department of Commerce. He will be joined at the table by the Honorable William Perry Pendley, Deputy Secretary of Energy and Minerals at the Department of the Interior; Mr. Robert Trimble, Acting Deputy Undersecretary of Acquisitions in the Department of Defense, and Mr. John Marcum, assistant for national resources in the Office of Science and Technology policy.

Mr. Wright, we are pleased to have you here and we are delighted to receive your testimony.

STATEMENT OF HON. JOSEPH R. WRIGHT, DEPUTY SECRETARY OF COMMERCE, DEPARTMENT OF COMMERCE; WILLIAM PENDLEY, DEPUTY ASSISTANT SECRETARY, ENERGY AND MINERALS, DEPARTMENT OF THE INTERIOR; ROBERT F. TRIMBLE, ACTING DEPUTY UNDERSECRETARY FOR ACQUISITION AND MANAGEMENT, DEPARTMENT OF DEFENSE; AND JOHN M. MARCUM, ASSISTANT TO THE DIRECTOR FOR ENERGY AND NATURAL RESOURCES, OFFICE OF SCIENCE AND TECHNOLOGY POLICY

Mr. WRIGHT. Thank you, Mr. Chairman. I understand your time problems. We will try to be very brief. I would like to submit my formal testimony for the record.

The CHAIRMAN. We will make your statement, in its entirety, a part of the record.

Mr. WRIGHT. I will spend no more than 1 or 2 minutes very briefly summarizing what the Department of Commerce is doing in response to the 1980 act. As my testimony indicates, we do have some additional concerns, particularly, end use of the strategic stockpile and the distribution of strategic minerals and materials to American industry for the purpose of satisfying the strategic needs of the nation.

In regard to the Act itself, the Cabinet Council on Natural Resources and the Environment is the administration vehicle for developing Presidential recommendations on strategic materials. I know this has been of concern to this committee. The Department of Commerce is a member of the Cabinet Council's strategic materials policy working group, and we have set up a minerals and materials task force within the Department that reports directly to me.

More specifically, the Bureau of Industrial Economics in our department now monitors over 200 domestic industries, including those that process and use critical materials. In the future we plan to monitor not only the industries that use these materials but the materials themselves. Department specialists now provide figures on industry consumption, productive capacity estimates and market impact statements on proposed stockpile acquisitions and disposals. This information is transmitted regularly to FEMA and GSA to support stockpile planning.

At Commerce we are also helping industry to develop the technology for substitutes for and conservation of critical materials. The National Bureau of Standards, for example is currently studying metallic strength and resistance properties of intermediate products which go into steel production, in order to help develop compatible substitute materials.

Another long-term solution to the strategic materials problem is the mining of the deep seabed for deposits of manganese, cobalt, and other minerals. NOAA is currently working with the State Department to develop reciprocating State arrangements for mutual recognition of mining activities of other countries which enact similar legislation and programs. By law, commercial recovery cannot begin until 1988, but we expect to be ready to process applications for licenses for exploration in 1982.

We are also leading the review in the strategic materials working group in the area of regulatory reform. As you know, Mr.

Chairman, there are approximately 80 different Federal laws administered by 20 different Federal agencies which govern development and processing of mineral resources. We are examining how current regulations affect these industries and how this administration can resolve any conflicts between regulatory and materials availability goals. Through our trade policies and programs we actively participate in international discussions and negotiations on commodity issues in which the interests of both importing and exporting countries are represented, and we will continually keep the supply of strategic materials as part of the overall trade goal.

The Act specifically directed the Commerce Department to conduct a materials need case study related to national security, economic well being and industrial protection. We have decided to make the aerospace industry our materials study because it is clearly essential to national defense, with aerospace procurement accounting for 46 percent of total production. Our report will be delivered to Congress in October of 1981 this year.

That is the end of my summary, Mr. Chairman. I would be more than happy to answer any questions.

[The prepared statement of Mr. Wright follows:]

STATEMENT BY DEPUTY SECRETARY OF COMMERCE

JOSEPH R. WRIGHT, JR.

BEFORE THE HOUSE COMMITTEE ON SCIENCE AND TECHNOLOGY

July 28, 1981

Mr. Chairman, members of the Committee, I am pleased to appear before you today to discuss the activities of the Commerce Department pursuant to the National Materials and Minerals Policy, Research and Development Act of 1980.

You and your colleagues have been considering problems of materials and minerals supply extensively over the past several years. The Act reflects your deep concern over increasing U.S. dependency on foreign sources of supply for raw and processed goods and the pressing need for a materials and minerals policy.

- Our defense capabilities and economic well-being are critically dependent on more than 20 non-fuel minerals and we import more than 90% of our annual needs of seven on these minerals -- including manganese, cobalt, chrome, and the platinum-group metals -- and more than 50% of our annual needs of the other thirteen. And the continued supply of some of these minerals is dependent on imports from potentially unstable regions.

- Our growing dependence on imports is due in part to the declining competitiveness of our domestic industry, particularly the materials processing industries. U.S. production of ferromanganese and ferrochromium has declined from 85% of domestic consumption in the 1960's to about 40% in 1980 and other important processed materials -- including lead, zinc and copper -- annually contribute to a declining percentage of domestic consumption.

- The overwhelming bulk of the materials in the nation's strategic stockpile was assembled more than 20 years ago. There is a need to restructure the materials and minerals in the stockpile:

  -- While the existing inventory contains $15 billion worth of raw materials, some $7 billion of those materials are excess to present national security needs.

  -- For 23 of the 61 materials contained in the strategic stockpile the quantity available falls at least 50% short of the goals established by the Federal Emergency Management Agency in the Annual Materials Plan. Commerce is represented on the committee that formulates this plan.

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Included in those 23 are such materials as cobalt, bauxite, nickel, tantalum, and the platinum-group metals. Both Government and American industry are concerned with the quality and usefulness of even those $8 billion of needed materials now in the stockpile.

The existence of these facts presents us with a number of problems and questions that should be answered.

- We lack sufficient knowledge of the materials requirements of our industrial base which has changed since the stockpile was established, both in the short-term and the long-term for national security purposes. Also, the quality of our stockpile materials may not be adequate in all cases for emergency use by industry in meeting national security needs.

- There could be a need for additional processing of the materials in the strategic stockpile to make them acceptable from the national security point of view.

- We have not fully analyzed the potential impact of new technologies on our materials needs.

- There could be serious distribution problems involved in moving the materials through the production cycle.

- Our international economic and trade policies should be reviewed from the standpoint of focusing on increasing access to materials supplies.

The Department of Commerce is committed to play a major role in solving these problems as well as carry out the responsibilities under the 1980 Act.

I. THE CABINET COUNCIL ON NATURAL RESOURCES AND THE ENVIRONMENT IS THE ADMINISTRATION'S VEHICLE FOR DEVELOPING PRESIDENTIAL RECOMMENDATIONS ON STRATEGIC MATERIALS.

The Administration has assigned overall responsibility for formulating a minerals policy to the Cabinet Council on Natural Resources and the Environment which is chaired by Secretary of the Interior and is responsibile for formulating policy recommendations. The Department of Commerce is a member of the Cabinet Council's Strategic Materials Policy Working Group.

In the Cabinet Council system, national policy can be formulated with the assurance that all Federal departments and agencies have an opportunity to express their views and make their contribution.

Because of the importance of this subject matter to American industry, we have set up a Minerals and Materials Task Force within the Department of Commerce reporting directly to me. It includes representation from each unit within the Department having a minerals or materials related function.

Along with participating in the formulation of policy at the Cabinet Council, the Department of Commerce can direct its resources and competence to help industry and government solve our materials and minerals problems/questions mentioned earlier. We can (1) perform end-use analyses of materials and minerals which will help us to understand better our materials needs, (2) support technological innovation which increases materials and minerals supplies and provides usable substitutes, (3) examine the impact of specific Federal regulations on our materials industry, and (4) evaluate international trade policies with regard to increasing access to supply sources.

II. END-USE ANALYSIS IS NEEDED TO DETERMINE THE ACTUAL REQUIREMENTS OF EMERGENCY PRODUCTION AND STOCKPILE MAKEUP.

The Commerce Department is interested in a stockpile which is responsive to current and future industrial demand and reflects present and future technologies.

Of equal concern are the possible capacity problems and bottlenecks to using the stockpile over the whole production cycle.

The Bureau of Industrial Economics (BIE) in our Department now monitors more than 200 domestic industries, including those that process and use critical materials. In the future, we plan to monitor not only the industries that use these materials, but also the materials themselves, in order to know which are needed to produce durable goods. BIE is currently in the initial phases of a study of our industrial capacity in relation to proposed defense expenditures.

Department industry specialists provide much of the basic economic data used in the development of stockpile goals, including industrial consumption and productive capacity estimates. We also prepare market impact statements on proposed stockpile acquisitions and disposals to determine effects on commodity markets and prices. This information is transmitted to the Federal Emergency Management Agency or the General Services Administration to support stockpile planning.

III. TECHNOLOGICAL INNOVATION SHOULD ALLEVIATE SOME OF THE CRITICAL SUPPLY PROBLEMS OF STRATEGIC MATERIALS.

We at Commerce are helping government and industry develop technological innovation for critical materials in such fields

as substitution and conservation. Substitution can be stimulated by economic forces and by technological advances. Two examples: the 1978 sharp price rise of cobalt caused many manufacturers to substitute nickel for cobalt. Our growing knowledge of polymer components means that the next civilian transports (Boeing 757/767) will use these composites for 3% of the airframe material, displacing the use of aluminum and other strategic materials. By the year 2000 estimates of polymer composite usage range up to 65% of airframe construction.

The National Bureau of Standards (NBS) provides a strong scientific base for such projects and performs basic research activities. NBS is currently studying metallic strength and resistance properties which may lead to increased knowledge concerning the basic properties of specific critical materials. NBS also conducts studies into the use of intermediate products which go into steel production, and seeks compatible substitute materials.

Many of the Department's basic science and engineering programs support American business and industry by improving materials characteristics and by seeking to economize on their use in essential applications.

In addition, the Administration supports several tax amendments to stimulate research and development activity. These R&D proposals would grant an incremental 25% credit for most R&D expenditures, including salaries, wages and materials. In addition, R&D expenditures outside the U.S. may be credited against U.S. source income. The Administration's tax proposals would permit depreciable equipment used for R&D to be eligible for a 6% investment tax credit and to be depreciated over a three year period. This will help the mining and processing industries develop the new technology needed to increase our domestic materials supplies.

Another long term solution is the mining of the deep seabed. We know there are enormous deposits of manganese, cobalt and other minerals which await recovery by harvesting nodules on the ocean floor. Through the National Oceanic and Atmospheric Administration's (NOAA) implementation of the Deep Seabed Hard Minerals Resources Act, we are working with the State Department to develop reciprocating state arrangements for mutual recognization of mining activities with other countries which enact similar legislation and programs. By law, commercial recovery cannot begin until 1988, but we expect to be ready to process applications for licenses for exploration in 1982.

IV. REGULATIONS MUST BE LOOKED AT CAREFULLY WITH A CONCERN FOR REBUILDING OUR ABILITY TO REACT TO A CRISIS.

The reform of both our Federal tax system and Federal regulatory policies is at the heart of this Administration's economic program. The very nature of mineral operations requires large capital expenditures in such areas as land reclamation, pollution control, and health and safety equipment. There are approximately 80 different Federal laws, administered by 20 different Federal agencies, which govern development and processing of mineral resources.

We are reviewing regulations on access to Federal lands for mineral exploration and environmental, safety and health regulations for burdensome and unnecessary provisions that may increase costs.

The Department of Commerce is leading the review of the Strategic Materials Policy Task Force in the area of regulatory reform. We are examining how current regulations affect the minerals and materials industries and how this Administration can resolve any conflicts between regulatory and materials availability goals.

V. INTERNATIONAL NEGOTIATIONS SHOULD CONSIDER THE FUTURE SUPPLY OF STRATEGIC MATERIALS AND MINERALS.

Through our trade policies and programs, we further free trade and create relationships which should help assure the reliability and diversity of sources of supply of strategic materials and minerals. We actively participate in international discussions and negotiations on commodity issues in which the interests of both importing and exporting countries are represented and will continually keep the supply of strategic materials as part of our overall trade goal.

On the other side of the coin, the Commerce Department investigates foreign trade practices involving minerals and materials imports which give them an unfair advantage over our domestic industry. We have used countervailing duties to protect our domestic ferrochromium industry from the impact of foreign subsidization. We are currently reviewing zinc imports from Spain.

VI. AN AEROSPACE INDUSTRY CASE STUDY WILL BE COMPLETED IN OCTOBER AS DIRECTED BY THE 1980 ACT.

The National Materials and Minerals Policy, Research and Development Act of 1980 directed the Commerce Department to

conduct a materials need case study related to national security, economic well-being, and industrial production. We have decided to make the aerospace industry our materials case study. The Department's Minerals and Materials Task Force, is currently completing the aerospace industry case study which this Department has undertaken pursuant to the Act. Our report will be delivered to Congress in October, 1981 as part of the Administration's materials policy package.

The aerospace industry is not only one of our most vital industries from the defense and economic standpoints, it is also a large consumer of a variety of materials, including many which are considered strategic. The aerospace industry is clearly essential to national defense with aerospace procurement accounting for about 46% of total defense procurement. It is the foremost contributor to our trade balance among U.S. manufacturing industries. About 65% of the raw material inputs of the aerospace industry are now imported.

In our study, we decided that a representative range of materials problems and issues could be addressed through an in-depth examination of a few materials or processes. At a public workshop held in February representatives from industry, government, and universities gave their views on current aerospace material needs. Just last month, we held a second

public workshop to get industry views on the potential of advanced materials in aerospace applications. With the information provided by our materials offices and industry, our case study will forecast materials demand in the aerospace industry, evaluate limitations on the supply side, and review policy options.

The Act also requires the Department to continue to identify and assess such cases. We will be submitting these reports to you in the future.

CONCLUSION

The problems that face us in the strategic materials and minerals area are difficult to solve. A number of Executive Branch departments and agencies have key roles to play. We intend to use the Commerce Department's materials capabilities to help determine business' needs, and to use our resources in the area of foreign trade to evaluate with other appropriate agencies issues regarding the reliability and diversity of foreign sources of supply of strategic materials and minerals.

This concludes my prepared statement. I will be pleased to respond to any questions.

The CHAIRMAN. We will hear from all of the witnesses because many of the questions may be interrelated and you may care to comment. So at this time we will be hearing from Mr. Pendley.

Mr. PENDLEY. Thank you, Mr. Chairman.

The 1980 law requires the Secretary of the Interior to do fundamentally three things. First, to improve the capacity of the Bureau of Mines to assess international minerals supplies; second, to increase the level of mining, metallurgical research by the bureau in critical and strategic minerals; and third, to improve the availability and analysis of mineral data in Federal land use decisionmaking.

First, to improve the bureau's capacity to assess international mineral supplies; we are strongly supporting the bureau's efforts to evaluate mineral properties located throughout the world and develop worldwide supply of the availability curves, based on mineral property evaluations. The worldwide engineering and cost evaluations of all major mineral properties for the 23 most critical mineral commodities will be completed by the end of fiscal year 1983, and worldwide supply availability curves based on this data should be completed by fiscal year 1984.

To improve the analysis of both foreign and domestic data we have proposed in this year's budget request that a mineral policy analysis office be established within the bureau. This new office will be the focal point within the bureau for addressing mineral policy issues and will serve as a mechanism for joint analytical efforts with other agencies. In addition, the department initiated a review by the Office of Mineral Policy and Research Analysis regarding the various mineral data systems now in use. We have three in an attempt to insure compatability, utility, and to reduce duplication. Finally, the bureau is now inventorying all mineral data systems within the executive branch and is identifying the location, the currency, and the relevancy of the data systems for policy related analysis and decisionmaking.

To fulfill the second requirement of the act, to increase the level of research related to critical and strategic minerals, we have revised the bureau's 1982 budget request and reprogramed $8.3 million from other research to studies more directly related to improved recovery of, and substitution for, critical and strategic minerals. We feel that that reprograming was a natural outgrowth and part of the direction of your bill, the 1980 act. While operating under the very tight restraints necessitated by the need to curtail federal spending generally, this redirection of research will enable the bureau to perform additional research involving the recovery of cobalt, chromium, manganese, nickel, zinc, tin, and titanium for domestic resources and involving the development of substitutes for those materials that are, for the most part, now imported.

Third, to improve the availability and analysis of mineral data in the Federal land use decisionmaking, Secretary Watt has directed the department to take steps necessary to improve decisionmaking relative to the utilization of our Nation's land. Adequate mineral information for balanced land use decisions, as essential as it is, is the most difficult part of the land planning process. The very history of mining is that mineral deposits are often found where we had no previous hint of their existence. Discovery is often made

only after repeated exploration efforts, sometimes spanning many years. While we can identify some areas of potential, we are never 100 percent sure.

A major step in the right direction, I believe, would be the reexamination of the responsibility of Government as to its management of the public lands to assure that minerals receive proper consideration. This process is now underway at the Department of the Interior.

Let me add at that point that the new director of the Bureau of Land Management has recently reorganized the bureau to form a post for a deputy director for energy and mineral resources, to ensure that energy and mineral resources of the public land receive the attention necessary in the land use decisionmaking process.

Let me conclude, Mr. Chairman, by indicating the approach of this administration toward the full implementation of the 1980 act. There can be no question but that this administration is 100 percent in favor of the adoption and the formulation of a national materials policy. The President has spoken in favor of such a program during the campaign, and more recently during the announcements regarding the stockpile acquisitions. Secretary Watt during his confirmation hearings, Secretary Baldrige during his hearings, Director Casey, Secretary Haig have all spoken about the need for a strategic materials policy. As a result, the Cabinet Council on Natural Resources and the Environment, whose chairman pro tem is Secretary Watt, has directed the formation of a working group on strategic materials policy. I have the privilege of sitting as head of that working group to aid in the coordination of the development of our policy of strategic materials.

One of the fundamental subgroups of that working group is one which deals with the implementation and reporting procedures regarding that implementation, on the Materials Policy Act of 1980. It is our intention to report to the Congress on a timely basis regarding the activities which we are now undertaking to fully implement the law.

Mr. Chairman, that concludes my statement, and of course, I am prepared to answer your questions.

[The prepared statement of Mr. Pendley follows:]

STATEMENT OF WILLIAM P. PENDLEY
DEPUTY ASSISTANT SECRETARY--ENERGY AND MINERALS
DEPARTMENT OF THE INTERIOR
BEFORE THE
COMMITTEE ON SCIENCE AND TECHNOLOGY
JULY 28, 1981

Mr. Chairman and members of the committee, it is a pleasure to appear before you today to discuss the implementation of P.L. 96-479, the "National Materials and Minerals Policy, Research and Development Act of 1980." The 1980 Act sets this nation on a new and stronger course in the development of its minerals policy. Its provisions will help broaden and deepen our knowledge of minerals and materials, better coordinate mineral policy development with the organizations and agencies of the Executive Branch, and will provide greater awareness of the fundamental role minerals and materials play in the development of a vigorous economy and strong national defense. This Committee should be commended for the lead role it took during the last session of Congress to make this legislation a reality. I wish to particularly compliment you, Mr. Chairman, for your perseverance and personal effort, in the speedy and timely enactment of this legislation.

I think the record is clear that the 1980 Act has the strong support of this Administration. The development of a comprehensive strategic material policy is one of the chief tasks and major challenges the President has placed before his Administration. We are working hard and, I believe, successfully in carrying out the mandate of the new law. Allow me first to describe the actions we have taken within the Department of the Interior to carry out our responsibilities under the Act. Then I would like to briefly describe the coordination of other related activities called for in the law that are being carried out elsewhere in the Executive Branch.

The 1980 law requires the Secretary of the Interior to do three things: first, to improve the capacity of the Bureau of Mines to assess international minerals supplies; second, to increase the level of mining and metallurgy research by the Bureau in critical and strategic minerals; and third, to improve the availability and analysis of mineral data in Federal land use decisionmaking. A report on our actions in carrying out these responsibilities is due to the Congress by October 21 of this year.

First, to improve the Bureau's capacity to assess international minerals supplies, we are strongly supporting the Bureau's efforts to evaluate mineral properties located throughout the world and to develop worldwide supply availability curves based on mineral property evaluations. The worldwide engineering and cost evaluations of all major mineral properties for the 23 most critical mineral commodities will be completed by the end of FY 1983 and worldwide supply availability curves based on this data should be completed by FY 1984. To improve the analysis of both foreign and domestic mineral data, we have proposed in the FY 1982 budget request that a mineral policy analysis office be established within the Bureau. This new office will be the focal point within the Bureau for addressing mineral policy issues and will serve as a mechanism for joint analytical efforts with other agencies. In addition, the Department initiated a review by the Office of Mineral Policy and Research Analysis regarding the various mineral data systems now in use in an attempt to ensure compatibility and utility and reduce duplication. Finally, the Bureau is now inventorying all mineral data systems within the Executive Branch, and is identifying the location, the currency, and the relevancy of the data systems for policy related analysis and

decision-making. An interagency Minerals Information Coordinating Committee, chaired by the Bureau, is now carrying out this task.

To fulfill the second requirement of the Act to increase the level of research related to critical and strategic minerals, we have revised the Bureau's 1982 budget request and moved 8.3 million from environmentally -- oriented research to other studies more directly related to improved recovery of and substitution for critical and strategic minerals. While operating under the very tight restraints necessitated by the need to curtail Federal spending generally, this re-direction of research will enable the Bureau to perform additional research involving the recovery of cobalt, chromium, manganese, nickel, zinc, tin, and titanium from domestic resources, and involving the development of substitutes for those materials that are, for the most part, imported.

Third, to improve the availability and analysis of mineral data in Federal land use decision-making, Secretary Watt has directed the Department to take the steps necessary to improve decision-making relative to the utilization of our nation's lands. Adequate minerals information for balanced land use decisions, as essential as it is, is the most difficult part of the land planning process. The very history of mining is that new mineral deposits are often found where we had no previous hint of their existence. Discovery is often made only after repeated exploration efforts, sometimes spanning many years. While we can identify some areas of potential, we are never 100 percent sure. We simply do not know nor will we ever completely know where all of our mineral

deposits lie. Neither can we easily predict the technological and economical--and sometimes political--circumstances that make mineral deposits minable.

Ironically, because most of our knowledge on the mineral character of public lands is largely the result of exploration and mining by the private sector, the availability of new information becomes a factor of decisions that affect the private sector's accessibility to such lands.

A major step in the right direction, I believe, will be re-examine the responsibility of government as to its management of the public lands to assure that minerals receive proper consideration. This process is now underway at Department of the Interior.

As I hope you can detect, Mr. Chairman, the Department of the Interior has made major progress in implementing the 1980 law--particulary when one considers the start-up time involved in the change of Administrations. Our work is far from complete in carrying out the letter of the new law, but I believe we have deamonstrated a compliance with the spirit of that law.

In addition to these efforts within the Department and related activities mandated by the law for other agencies, the Cabinet Council of Natural Resources and the Environment has been given the responsibility for formulating a National Materials Policy by the President. In carrying

out this responsibility, the Council has established a Strategic Materials Policy Working Group, I have the privilege to chair. The working group contains participants from eighteen different agencies and organizations and has divided its tasks into eight separate issue areas. One of the eight issue areas deals specifically with compliance with the provisions of the 1980 Act and coordination of the various actions called for by the law. The other seven issue areas under study by the working group, related directly to the 1980 Act, and are thus an essential part of our response.

Thank you, Mr. Chairman for your consideration.

The CHAIRMAN. Thank you very much, Mr. Pendley. Now we will hear from Mr. Trimble.

Mr. TRIMBLE. I am Mr. Trimble from the Department of Defense. I have a prepared statement which I would like to enter into the record.

The CHAIRMAN. We will make that part of the record.

Mr. TRIMBLE. Before commencing, I would make the observation that the Department of Defense generally does not buy basic raw materials. Rather, we do buy the finished product, many of which are extremely important to the defense of the country. We have a very high regard for the criticality of this matter of the shortage of materials and minerals. To support the important objective that has been set forth to improve our posture regarding materials and minerals, the Department of Defense is enthusiastically fulfilling its responsibilities under the act of 1980.

The following are actions that we have taken or are taking. No. 1, we have established a Department of Defense (DOD) team of senior professionals who are assigned to our industrial resources and our research and development offices to assume the responsibility of all tasks required to meet both the spirit and letter of the law. This team is working closely with the Departments of Interior, Commerce and State, the Central Intelligence Agency, National Security Agency, and Federal Emergency Management Agency to ensure that we have a coordinated Government-wide plan for the resolution of problems relating to minerals and materials. They are also working with the White House Council on Natural Resources and Environment in an effort to develop a unified position under Public Law 96-479.

Two, we have tasked the Institute for Defense Analysis, a local not-for-profit studyhouse that works almost exclusively for the Department of Defense to provide us with information on which we can assess our need for minerals, materials. We have asked for research and development, in which we can develop appraisals for policy options.

Three, we have renewed and updated the charter and objectives of the Interagency Materials Availability Steering Committee which was established in 1974.

Four, we are assessing, with the assistance of the military departments, the impact of import dependency on specific weapon systems, subsystems, intermediate products, and structures.

Five, we have completed a proposed DOD-wide research and development plan for satisfying DOD critical and strategic materials requirements. This plan proposes a long-range Department of Defense-wide material substitute research and development program to assess our most critical needs. This plan is currently under review by the Joint Chiefs of Staff and will be reviewed by the Interagency Materials Availability Steering Committee.

Six, we conducted a DOD-wide metal matrix composites conference in May of this year, and also conducted a Department of Defense-chaired OSTP committee on materials, rapid solidification technology working group conference in July. Both conferences addressed the potential of these material technologies for developing substitute materials.

Seven, in May of this year we conducted a 3-day industry conference workshop in conjunction with the American Defense Preparedness Association and secured industrial inputs to our overall materials situation assessment.

This completes the summary of the actions that we have taken, and I am pleased to say that we have noted in all cases, Mr. Chairman, great enthusiasm on the part of Government agencies and industry groups to attempt to help us resolve the problem of our materials shortages. We are also at this time identifying those sources of materials and processing sequences which need to be imported.

This completes my prepared testimony, Mr. Chairman. I would be pleased to answer questions.

[The prepared statement of Mr. Trimble follows:]

STATEMENT BY ROBERT F. TRIMBLE
ACTING DEPUTY UNDER SECRETARY OF DEFENSE
FOR RESEARCH AND ENGINEERING (ACQUISITION POLICY)

July 28, 1981

MR. CHAIRMAN AND MEMBERS OF THE COMMITTEE:

I APPRECIATE THIS OPPORTUNITY TO APPEAR BEFORE YOU TODAY TO DISCUSS THE NATIONAL MATERIALS AND MINERALS POLICY, RESEARCH AND DEVELOPMENT ACT OF 1980, PUBLIC LAW 96-479, AND THE PROGRESS WE HAVE MADE TO MEET THE LEGISLATIVE RESPONSIBILITIES OF THE DEPARTMENT OF DEFENSE.

TO PROVIDE A NECESSARY PERSPECTIVE OF THIS IMPORTANT SUBJECT, I MUST CAREFULLY POINT OUT THAT THE DOD IS A DIRECT CONSUMER OF FINISHED WEAPONS SYSTEMS AND EQUIPMENT. IN THIS RESPECT, WE ARE USUALLY A SMALL CONSUMER IN THE OVERALL U.S. MARKET PLACE. WE GENERALLY DO NOT DIRECTLY ACQUIRE RAW MATERIALS, PARTICULARLY THOSE WHICH ARE PHYSICALLY INCORPORATED INTO WEAPONS SYSTEMS SUCH AS COBALT, TITANIUM, AND NATURAL RUBBER. HOWEVER, WE ARE CLEARLY AWARE OF THE IMPORTANCE OF MATERIALS AND MINERALS TO THE NATIONAL SECURITY AND THE VERY SIGNIFICANT INTEREST IN DERIVING NATIONAL POLICIES WHICH CAN PROVIDE A POSITIVE CONTRIBUTION TOWARD A STRONG AND HEALTHY AMERICAN INDUSTRIAL BASE.

TO SUPPORT THIS IMPORTANT OBJECTIVE, THE DEPARTMENT OF DEFENSE IS FULLY IMPLEMENTING ITS RESPONSIBILITIES UNDER THE NATIONAL MATERIALS AND MINERALS POLICY, RESEARCH AND DEVELOPMENT ACT OF 1980. THE ACTIONS WE HAVE TAKEN AND WHICH ARE ONGOING ARE:

1. ASSIGNED SENIOR MEMBERS OF THE SECRETARY OF DEFENSE STAFF REPRESENTING BOTH THE INDUSTRIAL RESOURCES AND THE RESEARCH AND DEVELOPMENT ORGANIZATIONAL ELEMENTS TO COMPLETE THE REQUIRED TASKS. THIS TEAM CONTINUES TO WORK CLOSELY WITH THE DEPARTMENTS OF INTERIOR AND COMMERCE AND OTHER CONCERNED AGENCIES IN FULFILLING THEIR RESPONSIBILITIES UNDER THE ACT.

2. SECURED THE SUPPORT OF THE INSTITUTE FOR DEFENSE ANALYSES TO ASSIST US IN ASSESSING THE OVERALL MATERIALS, MINERALS AND R&D SITUATION AND IN DEVELOPING POLICY OPTION IMPACT APPRAISALS.

3. RENEWED AND UPDATED THE CHARTER AND OBJECTIVES OF THE INTER-AGENCY MATERIALS AVAILABILITY STEERING COMMITTEE ORGINALLY ESTABLISHED IN 1974.

4. MAINTAINED CONTACTS WITH THE DEPARTMENT OF STATE, THE CENTRAL INTELLIGENCE AGENCY, THE NATIONAL SECURITY COUNCIL, AND THE FEDERAL EMERGENCY MANAGEMENT AGENCY.

5. INCLUDED THE MILITARY DEPARTMENTS AND THE JOINT CHIEFS OF STAFF IN OUR ONGOING EFFORT ASSESSING THE IMPACT OF IMPORT DEPENDENCY ON SPECIFIC WEAPONS SYSTEMS INCLUDING SUBSYSTEMS, INTERMEDIATE PRODUCTS, AND STRUCTURES.

6. COMPLETED A PROPOSED "DOD-WIDE RESEARCH AND DEVELOPMENT PLAN FOR SATISFYING DOD CRITICAL AND STRATEGIC MATERIALS REQUIREMENTS." THIS PLAN PROPOSES A LONG RANGE DOD-WIDE MATERIALS SUBSTITUTE R&D PROGRAM TO ADDRESS OUR MOST CRITICAL NEEDS. THIS PLAN IS CURRENTLY UNDER REVIEW BY THE JOINT CHIEFS OF STAFF AND WILL BE REVIEWED BY THE INTERAGENCY MATERIALS AVAILABILITY STEERING COMMITTEE.

7. CONDUCTED A DOD-WIDE METAL-MATRIX COMPOSITE CONFERENCE IN MAY OF THIS YEAR AND CONDUCTED A DOD-CHAIRED OSTP/COMAT RAPID SOLIDIFICATION TECHNOLOGY WORKING GROUP CONFERENCE/WORKSHOP IN JULY. BOTH OF THESE ADDRESS, AS A PORTION OF THE DELIBERATIONS, THE POTENTIAL OF THESE MATERIAL TECHNOLOGIES FOR DEVELOPING SUBSTITUTE MATERIALS.

8. IN MAY OF THIS YEAR CONDUCTED A THREE-DAY INDUSTRY CONFERENCE/WORKSHOP IN CONJUNCTION WITH THE AMERICAN DEFENSE PREPAREDNESS ASSOCIATION AND SECURED INDUSTRIAL INPUTS TO OUR OVERALL MATERIALS SITUATION ASSESSMENT.

9. WE ARE ALSO PARTICIPATING WITH THE STRATEGIC MATERIALS POLICY WORKING GROUP HEADED BY THE DEPARTMENT OF THE INTERIOR. THIS WORKING GROUP REPORTS TO THE CABINET COUNCIL ON NATURAL RESOURCES AND ENVIRONMENT. THIS EFFORT IS INTENDED TO PROVIDE A UNIFIED AND COORDINATED ADMINISTRATION POSITION UNDER PUBLIC LAW 96-479.

THESE ACTIONS ARE A CROSS SECTION OF THE ACTIVITIES WE HAVE BEEN MOVING FORWARD WITH SINCE ENACTMENT OF PUBLIC LAW 96-479. THEIR BASIS IS THE FUNDAMENTAL APPROACH OF BOTH IDENTIFYING THE ELEMENTS OF HIGH VALUE OR CRITICAL WEAPON SYSTEMS AND EQUIPMENT WHICH COULD BE SIGNIFICANTLY VULNERABLE TO POTENTIAL IMPORT DISRUPTIONS. CONVERSELY, WE ARE IN THE PROCESS OF IDENTIFYING THE SOURCES AND UTILIZATION OF THOSE SPECIFIC MATERIALS AND PROCESSING SEQUENCES WHICH ARE OBTAINED FROM OVERSEAS SOURCES.

THE CRITERIA BY WHICH THE DETERMINATIONS OF OUR DEGREE OF IMPORT DEPENDENCE ARE DETERMINED ARE A FUNCTION OF THE PERCEPTIONS AND POTENTIAL WARTIME SCENARIOS OF THE MILITARY COMMANDERS WITHIN THE JOINT CHIEFS OF STAFF AND THE MILITARY DEPARTMENTS. IN ADDITION, THE DOMESTIC INDUSTRIAL BASE PRODUCTION CAPABILITIES ASSOCIATED WITH THE IDENTIFIED MATERIALS AND PROCESSES ARE BEING CAREFULLY EXAMINED. FROM THIS MULTI-DIMENSIONAL MATRIX WE WILL DEVELOP A SERIES OF ADMINISTRATIVE, FISCAL OR PROGRAMMATIC ACTIONS THAT WE AND OTHER FEDERAL AGENCIES MAY IMPLEMENT.

THIS COMPLETES MY PREPARED TESTIMONY, I WILL BE PLEASED TO ANSWER ANY QUESTIONS THE COMMITTEE MAY HAVE.

The CHAIRMAN. Thank you, Mr. Trimble.

Now we will hear from Mr. Marcum.

Mr. MARCUM. Thank you.

I also have a statement that I would like to enter into the record.

The CHAIRMAN. We will make it part of the record, Mr. Marcum.

Mr. MARCUM. Before I begin, I would like to express personal greetings on behalf of Jake Keyworth, our new science adviser, to you and the members of the committee. As you may know, he was just confirmed by the Senate on Friday, and looks forward to participating with you in these sessions in the future. In his own view, the question of national materials and minerals is a very important issue, and he asked me to assure you that he would be according it a very high priority.

As a result of the time that has elapsed pending the confirmation, we are a bit late in getting started on our responsibilities under the provisions of this act. But I believe you will see, from the testimony that I do have to present, that we are in fact making some progress in this direction.

Let me summarize briefly what we are doing on behalf of the administration, to respond to the provisions of the act, and to institute a national minerals policy that will reduce our vulnerabilities. The actions reflect our overall approach of insuring that the national defense stockpile can deal with disruptions in supplies of critical materials. And we think it is important to consider critical materials questions more carefully, in the context of our overall foreign policy with both supplier nations and other countries that are important to critical materials.

Finally, it is important that we continue to fund R. & D. on new materials and processes which are aimed at reducing our vulnerability in the longer term.

On March 13 of this year, the President announced the first purchase program for the national defense stockpile in over 20 years. We think that this is a very significant step. A great deal of the money involved will be going to the purchase of cobalt. We are also considering how to reinvest proceeds from the selloff of less critical materials such as silver from the stockpile, in purchasing other critical materials.

I will not elaborate on the major interagency review we have in progress, which has been described by the Department of the Interior. But we do think that it is a very important step in organizing the Federal Government to respond to the act. That review is being carried out under the Cabinet Council on Energy and Natural Resources.

There is also an ongoing NSC nonfuel mineral review, which was initiated in the last administration, but has now been reorganized to insure that the national security implications of materials policy are fully addressed. This study is presently considering policy options that would reduce our cobalt supply vulnerabilities. We expect the final recommendations concerning cobalt soon.

I would like to mention that there are a number of other, broader administrative initiatives which may be helpful in this area, and these include: tax measures on R. & D., and investment credits; patent and regulatory reform; and increasing access to public lands.

OSTP is, in fact, involved in several ongoing activities which will help constitute our eventual response to the Minerals and Materials Act:

The first part of this is to gather information on ongoing research programs and budgets. To do this, in March 1980, the director of OSTP formally reestablished the Committee on Materials, under the Federal Coordinating Council on Science, Engineering and Technology. This organization, called the COMAT, was tasked by OSTP to conduct a life cycle research survey for fiscal year 1980. It has now been completed. It has been coordinated with all of the agencies involved, and should be published within the next several weeks, by the National Bureau of Standards.

The new inventory improves on the earlier version, which you may have seen in 1976, by disaggregating research moneys on topics that are more appropriate to the strategic minerals problem. I have copies of the report, advance copies, which I would be pleased to leave with the chairman and members of the committee.

I have included in my testimony a summary of the key findings of this survey. In the interest of brevity, I will skip those for the time being. They are included in the report.

Let me mention one cautionary note with regard to this survey. And that is that funding amounts disaggregated into different categories for materials R. & D. are necessarily subject to major uncertainties. This is a consequence of the fact that there are very few materials—critical materials—R. & D. items that are included as line items in the Federal budget.

Therefore, those amounts have to be extracted from the programs and purposes for which they are actually intended. There is some uncertainty in these figures, but we do think, nonetheless, that the report constitutes a very useful first step in understanding ongoing Federal programs in this area.

I would like to also mention—as my colleague from the Department of Defense did—the issue of rapid solidification technology. As you may know, this technology was initiated and funded primarily with Federal funds. It shows the promise of achieving materials with superior properties, as well as materials which could substitute for strategic minerals.

A subcommittee chaired by the Department of Defense recently held a conference, as mentioned earlier, at NBS, to provide industry with information on RST—rapid solidification technology—technology and implementation. The general purpose of the meeting was to help accelerate the transfer of this technology to industry, and to stimulate industry-university involvement, to effect a wider range of S. & T. applications.

The conference was held on the 1st of July, and we think that it was very successful. It had about 280 attendees, with 180 from private industry. A report on this meeting will be issued subsequently.

Finally, OSTP has also contracted a study with Prof. Herbert Fusfeld, director of the Center for Science and Technology at NYU, to assess R. & D. trends in the nonferrous metals industry. We are currently reviewing that report.

Taken together, we believe that these activities do provide a good starting point for the OSTP's responsibilities under this act.

We are currently trying to consider how best to utilize the COMAT and our access to outside organizations and expertise, in formulating our response to the requirement for a longer term, 5-year survey responsive to the act. And we will be pleased to keep in touch with the committee, as this work proceeds.

That concludes my prepared testimony.

[The prepared statement of Mr. Marcum follows:]

STATEMENT BY MR. JOHN M. MARCUM

OF THE OFFICE OF SCIENCE AND TECHNOLOGY POLICY

BEFORE THE HOUSE COMMITTEE ON SCIENCE AND TECHNOLOGY

July 28, 1981

Mr. Chairman and members of the Committee: I am pleased to appear before you today to discuss a topic that this Administration feels is particularly important, materials and minerals policy, and to discuss the activities of the OSTP pursuant to the National Materials and Minerals Policy, Research and Development Act of 1980.

It is useful to distinguish between long-run problems and short-run problems in minerals and materials policy. Short-run problems include the prospect of disruptions of supply and involve policy options such as stockpiles, trade agreements, and procurement strategies. In my testimony, I will provide a brief discussion of this Administration's commitment to ensuring that such disruptions do not endanger our security and the steps it is taking to ensure that appropriate policies and programs will be implemented. I will then discuss on-going government activities which are related to the longer-term problems associated with assessing our materials, resources and needs, identifying substitution opportunities, improving the competitiveness of our materials and minerals industry, and providing for appropriate R&D in these areas. The new Director of OSTP, Dr. George A. Keyworth, was confirmed by the Senate this past Friday and as a result we are just now getting organized to deal with this

issue and respond to the provisions of the Act. However, he is fully aware of the importance of the materials and minerals problem, and asked me to tell you that he plans to accord it a high priority.

As you have heard in earlier testimony today, concrete actions have already been taken by the President to institute a national minerals policy that will reduce our minerals supply vulnerabilities. These actions reflect our overall approach of

(1) ensuring that the national defense stockpile can deal with disruptions in supply of critical materials;

(2) considering critical materials questions more carefully as part of our foreign policy with other nations; and

(3) continuing to fund R&D on new materials and processes aimed at reducing our vulnerability in the longer term.

On March 13 of this year, the President announced the first purchase program for the national defense stockpile in over 20 years. As you know, a great percentage of this money will be used to purchase cobalt and we are considering how to reinvest money from sell-off of stockpile materials such as silver for stockpiling other critical materials. As you have heard, the Department of the Interior is currently heading a major interagency review of our materials and mineral policy under the Cabinet Council on Energy and Natural Resources. Also, the NSC Non-Fuel Minerals Review initiated in the last Administration has been restructured to ensure that the national security implications of minerals policy are fully addressed. This study is presently

considering policy options that would reduce our cobalt supply vulnerabilities. The use of Title III of the Defense Production Act to promote domestic production of cobalt, increased stockpiling, and improved international communication have been the main subjects of study. We expect our final recommendations concerning cobalt to be completed soon. In addition to these measures, there are a number of broader Administration initiatives which could be helpful in this area. These include tax measures such as R&D and investment tax credits, regulatory and patent reform, and increasing access to public lands.

Now I would like to describe some on-going activities of this office that will contribute to our eventual response to the Minerals and Materials Act. A major first step in assessing the Federal Government's adequacy in R&D on materials and minerals is to gather information on ongoing research programs and budgets. Accordingly, in March of 1980, the Director, OSTP, formally re-established the Committee on Materials (COMAT), under the Federal Coordinating Council for Science, Engineering and Technology. The COMAT was tasked by OSTP to undertake a comprehensive survey of Federal Life Cycle Research in Materials R&D for FY 1980. I am pleased to inform you that this survey has just been completed and should be published within the next several weeks by the National Bureau of Standards. This new inventory improves on the earlier version by disaggregating research monies by topics that are more appropriate to the strategic minerals problem.

Following are the key findings of the survey:

Total Federal R&D funding for materials R&D in FY 1980 was $1,103,683K vs. $961,320K in FY 1976.

72% of total funding was provided by 3 agencies: DOE, DOD, and DOI.

Comparable amounts were reported for basic research, applied research, and development: $326 M, $413 M and $358 M, respectively.

32% of the 1980 Federal materials R&D funding was directed to improved energy supplies; 23% to national security; 16% to improve the science and technology base and 5% to improve industrial productivity.

In terms of stages of the materials cycle, the largest expenditures (26%) was directed to applications and utilization of materials.

23% of the 1980 Federal materials R&D was performed within the funding agencies and an additional 30% in non civil-service Federal laboratories; 42% was performed by the private sector: 23% by industry, 19% by universities.

$66.87M of the 1980 Federal R&D in materials was related to technologies for reducing U.S. dependence on critical and strategic materials (Table 2).

Critical materials research was reported for fourteen elements with the largest expenditures on developing sub-

stitution and life extension technologies for chromium containing alloys. Substantial efforts were reported for aluminum, titanium, nickel, and cobalt (Table 6).

I would like to add as a cautionary note that the funding amounts in the report are subject to substantial uncertainties. This is due to the fact that materials R&D is usually not an end in itself and therefore the funding levels are usually not budget line items. Nevertheless, I believe that the results provide a useful perspective on federal activities in materials R&D. I have with me advance copies of the report which I would like to leave with the Chairman and Committee.

A subcommittee within COMAT has also taken up the issue of rapid solidification technology (RST). As you may know, this technology was initiated and funded primarily with Federal funds. RST shows a promise of achieving materials with superior properties as well as materials which could substitute for strategic materials. The subcommittee is chaired by DOD and recently held a conference at NBS to provide U.S. industry with information on RST technology and implementation. The general purpose of the meeting was to help accelerate the transfer of this technology to industry and to stimulate industry/university involvement to effect a wider range of RST applications. The conference was held in July 1-2, 1981, and was very successful with about 280 attendees including 180 from industry. A report will be issued subsequently.

In addition to these activities, OSTP has contracted with Prcfessor Herbert Fusfeld, Director of the Center for Science and Technology at New York University, to assess R&D trends in the non-ferrous metals industry. We are currently reviewing their report. Taken together, these activities provide a good starting point for OSTP's responsibilities under the Act. We are currently considering how best to utilize COMAT and non-government experts in carrying out the longer-term assessment called for in the Act and would be pleased to keep the Committee informed as this effort proceeds.

This concludes my prepared statement. I will be pleased to respond to any questions the Committee may have.

The CHAIRMAN. Thank you, Mr. Marcum.

I want to thank all of the witnesses, particularly Mr. Trimble. It appears that DOD is getting its act together, and by the activities that you outlined, taking seriously the implementation of the bill. I realize that it is a big Department—probably one of the largest users of strategic materials. So your interest, from that standpoint, is certainly understandable.

I just wanted to commend the Department for what I think appears to be a good job in getting it implemented.

Mr. TRIMBLE. Thank you, sir.

I have with me today three members of my staff, who all are working extremely hard, and I am very gratified, as an official in the Department of Defense, at the response that our people, and also industry, are giving us to this matter.

The CHAIRMAN. That's good.

We may also have some written questions that we may not get to today. We may want to submit them to you, and you can submit them back to us.

QUESTIONS FOR THE

ROBERT F. TRIMBLE

1. Could you elaborate upon what are the major defense requirements for critical and strategic materials over the next five years? Is close cooperation being maintained by DOD with other Federal Departments having major materials-supply responsibilities -- especially Interior and Commerce -- to assure that these defense-related materials needs will be met? How?

2. What are the major problems currently being encountered by DOD in assuring a sufficient supply of critical and strategic materials for defense purposes? What are some of the steps that might be taken, either by the Administration or the Congress, to help solve some of these problems?

3. Is stockpiling, a strategy implemented in the late 1940's, still viable today? Is this being critically analyzed? The Defense Production Act of 1950 and the Strategic and Critical Materials Stockpiling Act essentially govern the Nation's stockpile of critical and strategic materials for defense purposes. In your opinion are these statutes adequate to the task? Do you see any gaps in our current stockpiling activities that need closing? Would you recommend additional legislation for this purpose?

4. Our understanding is that agency reports prepared in response to the 1980 Act will be compiled into one report by the Cabinet Council on Natural Resources and the Environment. Given the inevitable differences of opinion which exist among the contributants, are you satisfied with such a procedure? How will such difference emerge in the final DOD mandated assessment?

5. Will any part of the DOD report to the Congress carry a security classification? If so, how much?

6. Do you intend to include any budget requests with proposed program requests?

A 1976 study by the Committee on Materials (COMAT) of the Federal Council for Science and Technology (FCST) showed that DOE was the third largest supporter of materials research and development, with a budget of about $132 million, or 13.7 percent of total Federal materials R&D expenditures. (The recent COMAT study changes the specific numbers but not the relative amounts.)

   a. Is this level of activity adequate to maintain U.S. leadership in R&D for high-performance materials for defense purposes? Please explain.

   b. Has the current Administration, in planning for a significant increase in U.S. military capabilities

over the next several years, fully included consideration of defense-related materials R&D? How?

7. What do you anticipate the continuing level of effort will be (after October 21st) for those efforts performed in response to the 1980 Act? How often are future materials assessments anticipated?

8. Because the Department of Commerce-led aerospace industry case study includes an assessment of some of those same materials under DOD review, what interagency coordination efforts have occurred? Will future programs be integrated with DOC's efforts?

Answers to Hearing Follow-up Questions

Question 1: Could you elaborate upon what are the major defense requirements for critical and strategic materials over the next 5 years? Is close cooperation being maintained by DoD with other Federal departments having major materials-supply responsibilities -- especially Interior and Commerce -- to assure that these defense-related materials needs will be met? How?

Answer: DoD anticipates a continued high demand for strategic and critical materials that are required to meet the high performance requirements. We are and will continue to be import-dependent for many materials in the foreseeable future. For example, we have a 90 percent import-dependency for cobalt and a 98 percent import-dependency for chromium. We are working closely with the Department of Interior, Bureau of Mines; the Federal Emergency Management Agency; the Department of Commerce; and the National Security Council to identify domestic reserves and to develop actions for stimulating these capabilities with the major objectives of decreasing our dependence on foreign sources. In those situations where domestic resources are not available, we will continue efforts for development of substitutes and alternate sources of supply. In certain cases there will be an increased DoD demand for strategic and critical materials as we rebuild our national defense capabilities. This is expected to be a gradual increase and requires a continuing coordinating effort between DoD, industry, and other industries.

Question 2: What are the major problems currently being encountered by DoD in assuring a sufficient supply of critical and strategic materials for defense purposes? What are some of the steps that might be taken, either by the Administration or the Congress, to help solve some of these problems?

Answer: The DoD study currently underway to meet P.L. 96-479 requirements will provide a comprehensive identification of problems which are encountered in this area. The study will also provide both technical and policy options necessary to deal with these problems. In general, there appears to be a positive correlation between the increasing U.S. dependency upon foreign industrial sources and the apparent erosion of the U.S. industrial base. There are many direct and indirect problem indicators under assessment such as lengthened material lead times, program stretchouts, decreased productivity, increased costs, and other industrial symptoms. In our analysis it is clear that a strong U.S. economy is essential to national security, and our October report to the Congress will reflect this aspect. We wish to be a continuing participant in the deliberations, and actions resulting from the recommendations we will propose in our report.

Question 3: Is stockpiling, a strategy implemented in the late 1940's, still viable today? Is this being critically analyzed? The Defense Production Act of 1950 and the Strategic and Critical Materials Stockpiling Act essentially govern the Nation's stockpile of critical and strategic materials for defense purposes. In your opinion, are these statutes adequate to the task? Do you see any gaps in our current stockpiling activities that need closing? Would you recommend additional legislation for this purpose?

Answer: Since the U.S. is more import-dependent today than in the 1940's, stockpiling is a key element to modern national security. For this reason, stockpile strategies are continually analyzed. For record purposes, one result of our continuing effort is the Annual Materials Plan which is published each year. Existing statutes provide adequate legislation; however, congressional support is required for acquisition funds and disposal authorities. Since the stockpile is seriously out-of-balance between goals and inventories, congressional support is essential to resolve the differences and upgrade deficiencies. This does not require new legislation; it does require meaningful support of existent legislation.

Question 4: Our understanding is that agency reports prepared in response to the 1980 Act will be compiled into one report by the Cabinet Council on Natural Resources and the Environment. Given the inevitable differences of opinion which exist among the contributants, are you satisfied with such a procedure? How will such difference emerge in the final DoD mandated assessment?

Answer: The Cabinet Council approach is intended to provide a singular, unified Administration response to P.L. 96-479. DoD has no objection to this method to preserve the integrity of each department's input, each mandated report will be included as an appendix to the Administration response. Therefore, the DoD report will be provided intact.

Question 5: Will any part of the DoD report to the Congress carry a security classification? If so, how much?

Answer: Classified information will be minimized. However, certain specific weapon system requirements and mission impact assessments will require Secret clearance for access.

Question 6: Do you intend to include any budget requests with proposed program requests?

A 1976 study by the Committee on Materials (COMAT) of the Federal Council for Science and Technology (FCST) showed that DOE was the third largest supporter of materials research and development, with a budget of about $132M, or 13.7 percent of the total Federal materials R&D expenditures. (The recent COMAT study changes the specific numbers, but not the relative amounts.)

a. Is this level of activity adequate to maintain U.S. leadership in R&D for high-performance materials for defense proposals? Please explain.

b. Has the current Administration, in planning for a significant increase in U.S. military capabilities over the next several years, fully included consideration of defense-related materials R&D? How?

Answer: Any budget requests developed will be provided to the Cabinet Council for the Administration's consideration. The current DoD R&D budget is the result of a comprehensive assessment and is adequate to maintain U.S. leadership in materials R&D for defense purposes at this time. We will continue aggressive and comprehensive R&D considerations to maintain a leadership posture, particularly with the increased military capabilities planned.

Question 7: What do you anticipate the continuing level of effort will be (after October 21st) for those efforts performed in response to the 1980 Act? How often are future materials assessments anticipated?

Answer: The level of effort in this area after October 21st depends greatly upon the findings, conclusions, and recommendations included in the DoD report to Congress. We expect better problem definitions in general and specifically identifying courses of action DoD should take. We also plan to provide national policy options for congressional consideration. This is an essential element in our assessment since DoD market influence affecting capital assets is far less with basic industries (e.g., aluminum, steel, copper) than with weapon system manufactures (e.g., aircraft, missiles, tanks).

Question 8: Because the Department of Commerce-led aerospace industry case study includes an assessment of source of those same materials under DoD review, what interagency coordination efforts have occured? Will future programs be integrated with DOC's efforts?

Answer: DoD has coordinated fully with DOC in the planning and implementation of our responsibilities under P.L. 96-479. This relationship will continue in future efforts concerning critical materials, weapon systems, national security, the industrial base, and the economy.

United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

SEP - 8 1981

Mr. Paul C. Maxwell
Science Consultant
Committee on Science and Technology
United States House of Representatives
Suite 2321 Rayburn House Office Building
Washington, D.C. 20515

Dear Mr. Maxwell:

In reply to your August 5 letter, listed below are the answers to the follow-up questions to my testimony at the Committee's hearing on the "National Materials and Minerals Policy, Research and Development Act of 1980."

1. What guidelines has OMB given the Departments on making recommendations in their reports which will have budgetary impact? Will budget programs be included in the final program plan? If not, why not since this is mandated by P.L. 96-479?

   The Office of Management and Budget will continue to function in its traditional role of ensuring the compliance with the President's budgetary program or programs submitted by the various departments and agencies. Budget programs will be a part of the Administration's materials policy in large part due to the previously signed responsibilities of such departments, responsibilities which in the past have not been fully implemented. The focus of this Administration's approach to materials policy has been to place emphasis upon the need for Executive Branch coordination and to ensure the fulfillment of goals of the various departments and agencies with regard to materials availability.

2. Much controversy currently surrounds the Administration's expressed policy to reassess the minerals potential of public lands and, if judged appropriate, open these lands to mining activity.

   a. What is reliably known at present concerning the critical minerals potential of these public lands?

      There are numerous instances of strategic mineral availability upon the Federal Lands. Two cases immediately come to mind: 1) the platinum paladium deposit now being explored in southern Montana and 2) the cobalt deposit now being considered for development in central Idaho. In addition, most mineral experts believe that the state of Alaska possesses significant potential for strategic and critical minerals. One of the

long-standing difficulties with regard to administration of the public lands has been an inability of Federal Gvernment to know exactly where such minerals occur. As a result, the Federal Government has in the past relied upon the marketplace to develop those minerals that were economically feasible. Unfortunately, the Federal Government has increasingly withdrawn from exploration and development large portions of public land thus depriving the Nation of the chance to explore for new discoveries and the marketplace to guide their development.

b. What criteria will be used to determine whether or not a particular public land area will be designated for critical minerals resource development?

The Department of the Interior and the Executive Branch does not designate lands for critical mineral resource development simply because no one in advance can determine where minable mineral deposits occur. That is why it is vital and is the policy of this Administration to keep public lands available for multiple use, multiple use that allows for continued mineral exploration and development as Congress intended. This approach of course does not apply to those lands which the Congress has statutorily set aside for special purpose use such as parks.

c. What safeguards are being considered to assure that such public lands, upon completion of mining activities, will remain suitable for other public use?

The Department of the Interior has recently adopted surface use management regulations which will ensure that the development of mineral resources under the General Mining Laws are undertaken in a manner that adequately considers other surface uses. The Forest Service also has such regulations. In addition, mineral development upon the public land must comply with other environmental laws and regulations. It is the belief of this Department that these laws and regulations ensure balanced development of our Nation's minerals resources.

d. How is DOI countering, or at least recognizing, the fears and arguments of environmentally-conscious individuals, groups and organizations that increased mineral development on public lands is really unnecessary and will ultimately serve to ruin the recreational and other valuable uses of these lands?

Mining uses but a tiny fraction of the public lands. Congress provided for such important use in its major land use legislation. While recreation is important in the lives of our citizens, it is a responsibility of government to see to the economic well-

being of the Nation. As we have seen in the last several years, a continued drop in the economic productivity of the Nation seems to say that recreation should not always be the primary consideration governing land use.

3. What role, if any, does Interior see for the Committee on Materials (COMAT) in the future, especially in view of P.L. 96-479 and Secretary Watt's attention to minerals questions?

The role to be played by the Committee on Materials (COMAT) is under consideration by the Cabinet Council at this time. In the past that body has served as a coordinating responsibility and that may well be the best procedure to follow in the future.

4. How will Interior improve information gathering and analysis for each of its major and important mineral resource decisions:

1. Land-use planning
2. Wilderness study and periodic reassessment of designated areas
3. Withdrawal review
4. Withdrawal procedures
5. Leasing
6. Mining law administration

Each of these aspects of the the Department of Interior's important land management responsibilities and the proper procedures for ensuring action in accordance with the law and the facts is now under study within the Department of the Interior. The Department's policy with regard to these issues is now being developed.

5. Will improving mineral information for land use decisionmaking, as previously discussed, require more funds than currently budgeted?

We do not expect that additional budget funds will be required and that these goals will be accomplished through reallocation and redistribution.

6. With respect to the Cabinet Council on Natural Resources and Environment: Is NSF represented on the R&D working group? If not, why not? What is the focus of the R&D concerns?

The National Science Foundation is not represented on the Research and Development sub-working group. The Research and Development sub-working group has been focused primarily on the need for improved coordination and understanding of Government research and development activities as they relate to materials questions. In addition, there is concern with regard to the impact of existing regulatory policies as they affect the ability or the willingness of the private sector to initiate research and development activities.

7. How will the Cabinet Council's role accommodate the legally mandated role of the Office of Science and Technology Policy?

   The Office of Science and Technology Policy is represented on the Cabinet Council Working Group on Strategic Materials Policy.

8. How will conflicting views between the Departments be resolved with respect to P.L. 96-479?

   The departments and agencies working together in the sub-working groups as well as the Strategic Materials Working Group as represented at the Cabinet Council discussions will reach agreement with regard to national materials policy.

9. How much does it cost to keep the various working groups and sub-working groups of the Cabinet Council on Natural Resources and the Environment going? Assuming this mechanism becomes the Administration's answer to a materials policy group within the Executive Office of the President, would it not cost less to have a separate office set up?

   It is the conclusion of the Administration that the most effective means of implementing a national materials policy is through the Cabinet mechanism and its Cabinet Council, which permits a more immediate focus by high level Administration officials on the materials policy question.

Sincerely,

William P. Pendley
Deputy Assistant Secretary
for Energy and Minerals

RESPONSES TO QUESTIONS -- HOUSE COMMITTEE ON SCIENCE AND TECHNOLOGY

Hearings on Materials Policy

1. Could you discuss the extent to which the critical materials problems and needs of the aerospace industry are reflected in other major U.S. industries?

The Department of Commerce is studying the critical materials needs of the aerospace industry in response to a directive of the National Materials and Minerals Policy, Research and Development Act of 1980 (P.L. 96-479). The aerospace industry was selected for the case study because it fulfilled the specified criteria of an industry essential to "national security, economic well-being, and industrial production." The materials problems and needs of the aerospace industry are generally reflective of those of other major industrial end-users of a diverse range of raw and processed materials.

Impediments to efficient and cost-competitive production in these industries can occur at several points in the overall materials cycle. As a substantial portion of certain raw materials used by the aerospace and other industries is imported, there is some uncertainty in the price and reliability of the supply of selected raw material inputs. Problems in the intermediate processing and fabricating stages on the path from raw material to final product assembly may cause long lead times in obtaining processed parts and lags in production. At the upper end of the cycle, advanced engineering processes and materials are contributing to an increasing proportion of final product composition and may help conserve on critical raw materials and improve performance. However, problems may result from inadequate incentives to commercializing these new materials technologies.

While major industrial sectors do potentially have these general types of materials problems in common, the seriousness of the problems do of course differ by commodity and by end-use industry. For example, given the relatively small portion of total U.S. chromium demand originating from the aerospace industry, this sector could be reasonably successful in obtaining necessary chromium-bearing steels and alloys in the event of a supply disruption, albeit at higher cost. This may not be true for other industries. The Department of Commerce believes that the study of materials problems and needs from the perspective of the using industries may be a useful supplement to the examination of such problems within the context of the entire industrial economy.

2. The legislation calls for additional case studies on a continuing basis in the future. What are the most likely candidiates for the next several follow-on case studies? How will these differ from this initial case study of the aerospace industry?

P.L. 96-479 calls for additional case studies on industrial materials needs to be conducted by the Department of Commerce "as necessary." Upon the completion of the aerospace industry case study, we intend to review the study for the adequacy of the methodology and the benefits or insights for policy-makers derived from this type of analysis. If substantial insights into the materials problems of industry and the appropriate role of government result, the Department of Commerce will consider the conduct of future case studies. They will differ from the original case study in terms of any refinements made in the methodology and in terms of the unique characteristics of the subject industry and commodities. For example, more accurate projections of the future materials needs of the aerospace industry have been afforded by the long delivery times in finished products characteristic of that industry. Other industries which are candidates for study include the automobile, semiconductor, and petrochemical industries.

3. In your study of the aerospace industry or any of the processing materials industries, have you come up with any hard evidence which suggests a problem in trained manpower in the future?

In the conduct of the aerospace industry study, the Department of Commerce has received comments from both industry and university representatives which corroborate information presented in a recent National Academy of Engineering report, "Academe/Industry/Government: Interaction in Engineering Education." Certain trends in engineering enrollment in universities could pose problems in obtaining sufficient trained manpower for the materials and other advanced technology industries in the long-term.

Undergraduate engineering enrollment is presently at high levels, with recipients of bachelor's degrees increasing from 40,000 in 1969 to 56,200 in 1979. However, it is thought that demand may outpace supply at this level in the next ten years as energy-conservation, automation, and defense considerations cause increased need for engineers in many industries. At the graduate level, the recipients of masters degrees increased from only 15,000 in 1969 to 16,000 in 1979 and doctoral level graduates declined from 3,400 in 1969 to 2,800 in 1979. A high portion of these engineering graduates are foreign students and there is an additional problem of attracting and keeping qualified engineering faculty in many of our universities.

The exact impact of these trends on the aerospace indstry and the materials processing industries is difficult to determine. However, certain provisions of the Administration's tax program should help bolster research and engineering enrollment at the graduate and undergraduate levels. A 25 percent tax credit for new spending on research and development will be applied to all expenditures made after June 30, 1981. Basic research contracted by industry to universities will be creditable, as will contributions to certain tax-exempt research organizations. In addition, the charitable deduction will be increased for the donation of certain research equipment to universities. These incentives to increased university research activities should help provide for our future trained manpower needs.

4. The primary policy focus of the present Administration seems to be "strategic minerals" and the chairman of the Cabinet Council's working group on Strategic Minerals Policy says that 95 percent of materials are minerals. How does this policy affect that of Commerce?

The development of an Administration program under P.L. 46-479 is proceeding on the basis of the definition of "materials" given in the Act: "substances, including minerals, of potential use that will be needed to supply the industrial, military and essential civilian needs of the United States in the production of goods and services ..... with the exclusion of food and of energy fuels as such." This definition is broader than just minerals or "raw materials" and includes products of mineral origin in further stages of the materials cycle. It also includes products not of mineral origin such as rubber.

Taking this definition into account, the Strategic Materials Policy Working Group was formed under the Cabinet Council on Natural Resources and the Environment to implement P.L. 46-479. While potential problems in the supply of critical minerals are a major concern, the Administration's program will address data collection, analysis, and policy formulation for a much broader range of materials. The Department of Commerce, which has primary responsibility for monitoring and analyzing materials in the latter stages of the materials cycle, is playing a major role in the development of this program.

5. Will the Department of Commerce have a continual role in the materials area after October 21, 1981? In what way?

The Administration's program in response to P.L. 96-479 will outline the role to be played by the Department of Commerce in materials analysis and policy development. We are now seeking means of better defining and improving this role within the overall Government materials and minerals program

as well as of improving the coordination of our internal materials activities. Areas where improved data and analysis would aid in policy formulation are being identified. Included in an improved Department of Commerce materials effort might be increased statistical monitoring of selected materials from the processing stage through final end uses; better analysis and identification of potential problems and bottlenecks in the latter stages of the materials cycle; more input into stockpile planning and policy development; and a better defined research and development program in the area of critical minerals and materials.

6. Does the Commerce study address (1) the increasing internationalization of the U.S. economy in which not only raw materials are imported but also semi-finished products, and (2) the need to precisely analyze and define what materials problems can be handled by the private sector and what materials problems cannot be?

In the study of the critical materials needs of the aerospace industry as well as in the review of our internal materials programs, the Department of Commerce is considering means of (1) analyzing and determining the effects of "internationalization" of materials production on our industrial base and national security, and (2) determining what, if any , should be the appropriate Government response. We are looking at how decisionmaking could be improved by better information and data on the locations and ownership of raw and processed materials production facilities. Such data on semi-finished products and parts is particularly scarce. Available information on cobalt, chromium, titanium, and tantalum -- the four materials which are being reviewed in the aerospace industry study -- has been compiled.

Analysis of the effects of importing raw and processed materials on the economy and defense base is done in a preliminary fashion in the aerospace study. Improvements in the methodology and analytical tools will be instituted over the long-term as part of the Administration's materials program. The findings of the aerospace study will provide a factual basis for decisions made in the development of the Administration's program. However, decisions re the appropriate private vs. public role in the minerals and materials area must take into account much broader policy considerations.

7. Secretary Baldridge's recent testimony before Senator Schmitt strongly suggests that, for Commerce, at least, stockpile policy is the primary materials issue. Is stockpiling emerging as this Administration's priority option for handling materials problems?

Strategic stockpile planning and policy are an important part of the Administration's materials program, but only one aspect of the overall materials policy area. Other equally important aspects being reviewed in the development of the Administration's materials program are the adequacy and coordination of Government minerals and materials research and development; the availability of domestic lands for mineral exploration and development; the adequacy and accessibility of materials data; the compatibility of regulatory and materials policy goals; the need for increased consideration of minerals and materials issues in formulating international investment, trade, and commodity policies; and the best and most efficient systems for materials analysis and policy development in the Federal Government.

The National Defense Stockpile is of course our primary emergency mechanism for dealing with supply disruptions of critical minerals and materials and is an important part of our defense mobilization system. The current configuration of the strategic stockpile, the ability of our industries to make use of the stockpile in an emergency, and our present stockpile planning mechanism are among the priority items under review in the materials area.

8. Secretary Baldridge also testified on the decline in the domestic production of ferroalloys. Is this considered important to our strategic security? Is a national security (section 232) investigation being considered? If not,why not?

Domestic production of ferroalloys has declined in recent years owing to a number of factors including high labor costs, regulatory restrictions, and increased imports from countries exporting more processed rather than raw materials. Section 232 of the Trade Expansion Act provides that action may be taken to adjust imports if such imports impair the national security; this finding should take into account the effects on the national security and the national defense of a change in the economic welfare of industries affected by such imports and the capacity of the U.S. to meet national security requirements.

On August 18, 1981, the Ferroalloys Association submitted a request to the Department of Commerce to assess the impact of imports on the domestic ferroalloys industry under the provisions of Section 232 of the Trade Expansion Act. The Department of Commerce has accepted their petition as containing the necessary documentation to conduct an investigation. This investigation must be completed within one year of the filing of the petition.

The CHAIRMAN. Mr. Pendley, you mentioned that you chair the strategic minerals working group. I was wondering if the council is part of the Executive Office of the President. It appears that that is their response to the requirement of the law for coordination to be conducted by the Executive Office of the President with the establishment of a Cabinet Council to an interagency coordination.

The question I guess I wanted to ask is: Do you think the Council superior to a permanent office in the White House?

Mr. PENDLEY. Mr. Chairman, let me answer that and respond to that. That is a very reasonable question, and it is an important question, in light of the direction under your legislation.

Let me answer that by first clearing up a question regarding the membership on the Cabinet Council. To look at the membership of the Natural Resources and Environment Cabinet Council would be to conclude that this is an extremely narrow group. It is composed, as a matter of course, on a daily basis, of about six different departments.

However, with regard to specific issues, when an issue comes before the National Resources and Environment Council, that affects, touches, and concerns other departments and agencies, those departments and agencies are invited in, and come in? We have participation, in this working group on strategic materials policy, of 20 different departments and agencies, including all of the agencies and departments represented here this morning.

It is our conclusion that the proper manner for the implementation of this important legislation is the Cabinet Council. Secretary Watt sits as chairman pro tem in the absence of the President; so he is the President's representative on the Council.

In addition, there is a tremendous respect within the administration for the professional civil servant in the Government: The ability of the Bureau of Mines employee, the ability of the Department of Commerce employee, Department of Defense employee, to do what is right and give us the type of professional advice that we need.

So, the conclusion was that what we needed to do was insure that that expertise was utilized. And rather than create a body within the Executive Office of the President, or over at OMB, that would have to be staffed up, and geared up, and come aboard—that we would rely instead on the experts in the departments and agencies, who are already up to speed.

The CHAIRMAN. That Council does not include the National Science Foundation, does it?

Mr. PENDLEY. It does not.

The CHAIRMAN. Or EPA?

It is only Cabinet-level departments included?

Mr. PENDLEY. We have the Environmental Protection Agency, OSTP, GSA, FEMA.

The CHAIRMAN. That is in the working groups?

Mr. PENDLEY. Yes.

The CHAIRMAN. But not in the Cabinet council?

Mr. PENDLEY. I don't believe so.

The CHAIRMAN. That is limited to the line Cabinet agencies?

Mr. PENDLEY. That is my understanding.

The CHAIRMAN. The subworking groups should bring the others in?

Mr. PENDLEY. In the subworking groups, all interested agencies and departments are represented. All of those agencies and departments which you speak of in your legislation are there with us.

The CHAIRMAN. Mr. Dunn?

Mr. DUNN. You gentlemen have all spoken enthusiastically of last year's act, which mandated that you define your critical needs, and recommend programs. And I believe—correct me if I am wrong—that that report is due October 1.

Is that correct, Mr. Chairman?

The CHAIRMAN. October 21, I believe.

Mr. DUNN. Do any of you gentlemen see any reason that those reports will not be completed by that time?

Mr. PENDLEY. No, sir. It is our expectation, Congressman, that we will have the report to the Congress at that time.

Mr. TRIMBLE. The Department of Defense will be on time.

Mr. MARCUM. Let me comment, on behalf of OSTP, that I think our report is the one that is not mentioned in the act with regard to a specific timetable. We are somewhat delayed in getting started on it, but we hope to have it completed as soon as possible.

Mr. DUNN. Thank you very much.

No other questions, Mr. Chairman.

The CHAIRMAN. Thank you.

Mr. Glickman?

Mr. GLICKMAN. Mr. Chairman, I have got some questions for the witnesses, that I think would best be done by writing, especially for the Department of Commerce—a followup on what are you going to do after your case study of the aerospace industry is completed.

I would hope that you would be able to answer those in writing, not necessarily now.

Mr. GLICKMAN. Mr. Marcum, you raised an issue which bothers me. On page 3 in your statement—and I am going to quote your statement—you say:

"In addition to these measures, there are a number of broader administration initiatives which could be helpful in this area."

You are talking about a variety of alternatives, and these include: "Tax measures * * * R. & D. * * * investment tax credits, regulatory and patent reform, and increasing access to public lands."

I don't see things in there about general research and development, about substitution of materials or minerals, about conservation, about recycling, about a whole host of other alternatives that require what I call some "basic research and development."

I wonder if you would care to comment?

Mr. MARCUM. I would say that those topics you just mentioned are major activities of the Federal Government in response to this act, and they are fully summarized and included in this report, which I do plan to leave with the chairman and the committee. All of those are quite important, and I would say constitute, along with the NSC—the National Security Council—study I mentioned, the major thrust of our response to the act on strategic minerals and materials.

Mr. GLICKMAN. And you mention increasing access to public lands. Why?

What critical materials are available in the public lands that you are aware of?

Mr. MARCUM. I would like to defer on that issue, since it is within the expertise of my colleague from the Department of the Interior.

Mr. PENDLEY. I would be glad to answer.

Let me go back to your first question. I think that is an important question, and clearly it is the direction of the 1980 act. That is, how it relates to recycling, substitution, conservation.

I think a fundamental aspect of research and development—particularly R. & D. work going on now in the Bureau of Mines—is supply of mineral materials. Each time you increase the amount of metal that is recovered from the ore, you decrease the amount of waste product that is put into the environment, that becomes a part of the water, the tailings—the atmosphere.

There is an aspect of increased productivity research that relates directly to your question, with regard to our reprograming of the $8.6 million at the Bureau of Mines. A substantial portion of that is going to this conservation, substitution aspect: The substitution of nickel, which we get from Canada, in place of certain uses for cobalt; replacement of manganese by other materials and minerals.

Let me address your second question, with regard to the public lands. The answer is: We simply do not know what is available out there. We know, only because we permit exploration, we permit environmentally sensitive exploration to take place. And the market develops and discovers those minerals.

We have perhaps—the jury is not in on it—but we have perhaps the world's best platinum group discovery in the Stillwater complex, in Montana. The people who are there, scoping out that deposit right now, are people who are familiar with the South African deposit—the lay of the land, the formation of that deposit. And some of those people are convinced it is larger than what South Africa has.

We have important cobalt in Idaho, cobalt that came within a whisper of being locked up in a wilderness area last year, but was saved as a result of the efforts of the House of Representatives, with the assistance of the chairman, and with help from Congressman Santini and others, to exclude the area from wilderness.

With regard to two specific instances, we do have those strategic and critical minerals. But the only way we know is to keep the lands open for environmentally sensitive exploration, so the people do have the incentive to go out and look for those ores.

Mr. GLICKMAN. I have no objection to that. I just hope that it is part of a more comprehensive policy dealing with issues of materials and minerals—that our strategic materials policy is not to just open all of the public lands of the United States, and not deal with issues such as substitution, recycling, and alternative methods of utilization, and related concerns.

Mr. Chairman, we have a vote now, so I will terminate my questions.

The CHAIRMAN. Mr. Lundine?

Mr. LUNDINE. I have no questions.

The CHAIRMAN. Mr. Walgren?

Mr. WALGREN. Mr. Chairman, I would like, at the outset, to ask unanimous consent to insert in the record a supportive statement for your bill.

The CHAIRMAN. Without objection.

[The opening statement of Mr. Walgren follows:]

OPENING STATEMENT

HEARINGS ON THE NATIONAL MATERIALS AND MINERALS POLICY, RESEARCH AND DEVELOPMENT ACT OF 1980

HONORABLE DOUG WALGREN OF PENNSYLVANIA

CHAIRMAN, SUBCOMMITTEE ON SCIENCE, RESEARCH AND TECHNOLOGY

I'M VERY PLEASED TO TAKE PART IN HEARINGS ON THE NATIONAL MATERIALS AND MINERALS POLICY, RESEARCH AND DEVELOPMENT ACT OF 1980 THIS MORNING AND I COMMEND CHAIRMAN FUQUA FOR BRINGING THEM TO THE ATTENTION OF THE FULL SCIENCE AND TECHNOLOGY COMMITTEE.

MATERIALS AND MINERALS NEEDS ARE CRUCIAL TO THE SUCCESS OF TECHNOLOGY IN MANY AREAS. SUCCESS IN FINDING RELIABLE SOURCES AND INNOVATIVE SUBSTITUTES, OR PROVIDING A WORKABLE STOCK-PILE POLICY, IS ESSENTIAL FOR THE SMOOTH OPERATION OF MANY OF OUR BASIC INDUSTRIES. IN MY HOME AREA OF PITTSBURGH, PENNSYLVANIA OUR INDUSTRY DEPENDS ON A VARIETY OF SCARCE MINERALS LIKE CHROME AND VANADIUM TO PRODUCE THE SPECIALTY STEELS AND OTHER ALLOYS FOR WHICH WE ARE SO WELL KNOWN. I WANT TO BE SURE THAT WE HAVE A NATIONAL STRATEGY FOR PROVIDING A SMOOTH FLOW OF THOSE MATERIALS OR SUBSTITUTES EVEN IN TIME OF INTERNATIONAL TENSION. I WANT ALSO TO BE ABLE TO ASSURE OUR INDUSTRIAL LEADERS AND THE PUBLIC AS A WHOLE THAT WE WILL NOT ALLOW OURSELVES TO BE BLACKMAILED OVER MATERIALS NEEDS. HAVING A RELIABLE STRATEGY

FOR FILLING MATERIALS NEEDS IS CERTAINLY CRUCIAL TO INDUSTRY. BEYOND THAT, IT MAY BE ALSO CRUCIAL TO WORLD STABILITY IN PREVENTING SITUATIONS WHERE THE ENTIRE WORLD'S ECONOMIC SYSTEM IS THREATENED BY POLITICAL CHANGE OR INSTABILITY SOMEWHERE ALONG A FRAGILE MATERIALS LIFELINE.

IN MY OWN SUBCOMMITTEE ON SCIENCE, RESEARCH AND TECHNOLOGY, WE HAVE HAD AN EXTENDED PROGRAM OF EXAMINING RESEARCH AND DEVELOPMENT NEEDS FOR INDUSTRIAL INNOVATION. OVER AND OVER AGAIN, THE INNOVATIVE USE OF MATERIALS EMERGES AS A KEY ELEMENT, AS I AM SURE IT DOES IN CONSIDERATION OF NEW ENERGY OR AERONAUTICAL TECHNOLOGIES. I HOPE TO WORK IN CONCERT WITH THE OTHER SUBCOMMITTEES ON OUR FULL COMMITTEE TO BE SURE THAT THE MATERIALS COMPONENT OF NATIONAL ENERGY, TRANSPORTATION, INDUSTRIAL, AND INNOVATION POLICY IS WELL PLANNED AND UNDERSTOOD BY THE INDUSTRY AND THE PUBLIC. WE CANNOT ALLOW THE CRITICAL NEEDS IN THIS AREA TO BE GOVERNED BY CHANCE.

Mr. WALGREN. I express my real interest and concern in this area. I would like to ask the representative from the Commerce Department, Mr. Wright—I apologize for coming in late; if you have gone over this ground already, please tell me.

It is my understanding that we have abused our stockpiles of various materials. I am particularly interested in chrome and manganese, with respect to the production of steel, coming from western Pennsylvania.

Does the Department of Commerce have an active plan to pursue stockpiling in this area?

And have you initiated studies which would allow us to assess our needs in this area, and bring into being some kind of planning flow, so that our industries are not left short?

Mr. WRIGHT. First: Do we have a study underway to determine exactly what the needs are of American industry, in order to meet the strategic requirements?

Yes, we do. In part, that will be brought out in the aerospace study that we will be submitting to Congress in October of this year; because that will hit some of the strategic materials and minerals that we are concerned about. Our study will cover not only the supplies, but where they come from, the political nature or sensitivity of those countries, what the economics are, the pricing, the distribution, the stockpile, and all the rest of it.

Beyond that, the Bureau of Economic Analysis, with its inter-industry matrix, is looking at how to determine where the supplies of these materials are going, industry by industry. I think that we could expand our knowledge substantially.

We are also studying the pricing impacts and stockpile use, which we think may have changed over the last 20 years.

Mr. WALGREN. When you talk about the aerospace industry, you certainly would cover chromium as a component of specialty steels. What about manganese as a component of basic steels?

Mr. WRIGHT. That I do not believe is included specifically in that study, but we will be covering that in terms of the industry-by-industry analysis of strategic materials.

Mr. WALGREN. Thank you, Mr. Chairman.

The CHAIRMAN. Thank you, Mr. Walgren.

We do have a vote. There probably will be a series of votes, so we do thank you.

We will send questions in writing for your response to them.

We appreciate very much you all being here and your testimony. Thank you very much.

[Whereupon, at 12:05 p.m., the hearing was adjourned.]

[Answers to questions asked of Mr. Trimble, Mr. Pendley, and Mr. Wright follow:]

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